

SYNOPSIS

A STUDY IN THE THEORY OF KNOWLEDGE

by

Lewis White Beck

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and acknowledged to me that he executed the same for the purposes and consideration therein expressed.

Given under my hand and seal of office this _____ day of _____ 1875.

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My commission expires this _____ day of _____ 1875.

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1937-3
Ph.D.

SYNOPSIS

A STUDY IN THE THEORY OF KNOWLEDGE

To Professor Alban C. Hildery I wish
to express my appreciation for his super-
vision of the preparation of this disserta-
tion. I am grateful also to Professor
Katherine Gilbert, Professor William Stern,
and Dr. George A. Morgan for their valuable
suggestions and criticisms.

L. W. B.

A thesis

submitted in partial fulfillment
of the requirements for the
degree of Doctor of Philosophy
in the Graduate School
of Arts and Sciences
of
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1937

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1937-3
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Science

The progress of science can perhaps best be called one of
specialization. In the **SYNOPSIS** other centuries have
been devoted to alchemists, physicists, biologists, and other
pursues the study of what was formerly considered
"natural philosophy." The growth of specialization has had many
consequences. Greater progress was made possible in re-
sponse to more intensive preparation in a narrowly restricted
line of inquiry. Under the influence of specialization each
branch of science grew autonomous, cultivating its
own methods and developing its own language. Becoming
convinced of their own territories, the specialized sciences
took up their own forms of allegiance to each other and to
the general progress of specialized sciences approached
the general progress of specialization caused a
division of the sciences into such specialties as
analytical chemistry, organic and inorganic
chemistry, and more and more divisions into such specialties as
physical chemistry, food chemistry, etc.

CHAPTER I

INTRODUCTION

1. The present era can perhaps best be called one of specialization. The "scientists" of other centuries have yielded place to chemists, physicists, biologists, and other experts in limited fields of what was formerly considered natural philosophy. The growth of specialization has had many salutary effects. Greater progress was made possible in research due to more intensive preparation in a narrowly restricted field of inquiry. Under the motive force supplied by specialists, each branch of science grew autonomous, cultivating its own subject matter and developing its own language. Becoming self-governing in their own territories, the specialized sciences soon cast off their bonds of allegiance to each other and to philosophy. The democracy of specialized sciences approached anarchy. The increasing degree of specialization caused a narrowing of the subject matter of each field of investigation and a consequent multiplication of the number of specialized sciences. For example, chemistry became organic and inorganic chemistry; then there were divisions into such specialties as electro-chemistry, colloid chemistry, food chemistry, etc.

Many of these specialized fields of research overlapped; and what was left to "general chemistry" was nothing more than some theoretical considerations common to all the fields, and so of pedagogic use.

With the differentiation of "natural philosophy" into its various branches, there remained, however, no single clearing house for the sciences similar to the one which "general chemistry" formed for its departmental branches. Some attempts, though, were made to introduce order into what was rapidly becoming chaos. This was one of the purposes, for example, of German Katarphilosophie and of French positivism. Some progress in this direction was made also by the "philosophers of science" of the latter half of the nineteenth century, e.g. Spencer, Haeckel, and Ostwald. Only this last group had a great deal of influence on scientific work, perhaps because only that last group was made up, for the most part, of men doing actual scientific research. There was one feature common to most of the "philosophers of science": they attempted to show one science to be fundamental and then to "reduce" other sciences to it. That is to say, the demand for an integration in the sciences was to be met by and within the range of some one science. This attitude has been well called "scientific imperialism."

Another attempt at integrating the sciences may be called the "technological" or "executive". Sciences touch broad fields of human interest through invention, using this term in a rather wide sense. It is not the purpose here to claim that scientific

work must be practical in any immediate economic sense; but it is apparent that, as sciences depend upon the society in which they are pursued for their support and furtherance, they cannot be entirely unrelated or inimical to the interests of those who pay for them. The scientific specialists of the past and of the present have not been working on problems divorced from human welfare, but on account of their specialization they have had little immediate concern with it. Thus it remains for the executive and his helper, the technologist, to apply scientific discoveries to the improvement of life.

As specialization is the prerequisite of the inventor and discoverer, so a broad general view is demanded of the executive. The control and coordination of large bodies of research workers, an insight into social needs, and an understanding of the means of social control are essential to the integration of the detailed works of the scientific researchers into projects for social betterment.

It is generally believed today that in some ways the executive has not been altogether successful. The executive has been too often himself a specialist -- a specialist in endeavoring to satisfy his own supposed needs regardless of the actual needs of the society which, in the final analysis, supported him also. Specialization in science led to scientific individualism; specialization in execution and administration led to short-sighted social planning and ruinous competition. The latter specialization has called for a corrective which, in some cases, government is furnishing. If such policy is justified, it

will be on the basis of the success with which government can comprehend, in a general view, the needs of society and the means of their fulfilment. Whether this can be done by government is beside the point, but the legitimate demand is that a comprehensive view of social needs and values replace partial and prejudiced views.

Thus the pure sciences have made some progress towards integration in two directions: attempts have been made to integrate them into "systems of sciences" and into social or technological systems. Quite summarily it may be said that both the research worker and the executive are being forced away from an individualism verging on chaos towards an orderly integration. In this integration, the scientific worker's task is to achieve special views; and the executive's task to attain and to employ a general view of a wide expanse of facts.

We may contrast these two types of workers under the names "specialist" and "synoptist".

3. What is meant by "synoptist"? A synoptist, he whose view of the world is "synoptic", is one who sees experience whole, not like one of the six blind men who felt only one part of the elephant and said, "It is a tree," or "It is a rope." What a synoptic view (synopsis) is cannot be determined precisely until further in this work; only a general preliminary characterization can be given here.

synopsis is a Greek word ($\sigma\upsilon\nu\omicron\psi\iota\varsigma$ = "with", "together", "at the same time" and "view") frequently used to mean a syllabus

or a summary. In the technical senses of the word which are here under investigation, the Greek *σύνολος* as it appears in Plato's writings was early translated as survey, and the adjective corresponding to it was rendered as comprehensive. Martineau ¹ in 1852 used the word synoptic in a technical sense to be examined later, and Pater ² and Bosanquet ³ later transliterated *σύνολος* in their studies of Plato. Then still later J. T. Merz ⁴, under the influence primarily of Comte ⁵ used the term synopsis as meaning a view of things "in their Together", the Greek word having been suggested to him by W. K. Sorley. Bosanquet then later took it up, perhaps from Merz, and used it in a technical sense in logic. ⁶ In American philosophy the term has been given its present vogue chiefly through E. S. Brightman. ⁷

If English lacks words for the translation of the Greek,

¹ James Martineau, "The Unity of Mind in Nature", Essays, Reviews, and Addresses (London, 1891) vol. III, p. 105.

² Walter Pater, Plato and Platonism (London, 1893), p. 151.

³ Bernard Bosanquet, A Companion to Plato's Republic (N. Y., 1895), p. 305.

⁴ Primarily in his History of European Thought in the Nineteenth Century (4th ed., Edinburgh and London, 1928).

⁵ A. Comte, Considérations Philosophiques sur les Sciences et sur les Savants (Paris, 1825).

⁶ B. Bosanquet, Application and Linear Inference. (London, 1930).

⁷ E. S. Brightman, Introduction to Philosophy, (N.Y., 1925).

German more than makes up for it. Though the Germans sometimes use die Synopsis⁵, the more usual terms are Überschau, Zusammenschau, Gesamtschau, Totalauffassung, Ganzheitsbetrachtung, and perhaps Übersicht. These echt-deutsche words give one a better impression of what is meant by synopsis than any short discussion could, for in them the interrelations of parts, the integrity of a whole, and the attitude of inquiry or inspection are clearly expressed.

3. It has been said by some writers on the problems of synopsis⁶ that the synoptic attitude towards reality is identical with the philosophical. In this they have the authority of Plato, who seems to have originated the word

⁵ E.g., Kant, Critique of Pure Reason, A, 97; W. Burkamp, Die Struktur der Ganzheiten (Berlin, 1933.) The word die Synopse is used in New Testament studies. Incidentally, some of the best descriptions of synopsis as a method can be found in discussions of its use in the N.T. studies. The first three gospels are spoken of as the "synoptic gospels", seeing the same collection of events as a whole. The term originated in Griesbach's Synopsis Evangeliorum (1794), who distinguished synoptic studies from studies of the "harmony of the gospels." While studies in harmony "auf eine Zusammenstellung des gesamten Stoffes der Evangelien zum Zweck einer womöglich chronologischen Gesichtsdarstellung des Leben Jesu absah, erstrebt die Synopse die übersichtliche Zusammenordnung des vielfach gleichartigen -- zusammenschaubaren -- Stoffes der Evangelien und verfolgt entweder exegetische Zwecke oder sie steht im Dienste der Erforschung des Problems des Verwandtschaftsverhältnisses der Evangelien untereinander." * Realencyclopädie für protestantische Theologie und Kirche, xix. Bd., 277. The word zusammenschaubar is significant.

⁶ E.g., Brightman, op. cit., pp. 29, 116; Merz, op. cit. iii, 192; R. F. A. Hoerle, "On the Way to a Synoptic Philosophy", in Contemporary British Philosophy, 2nd series, p. 146. (N. Y., 1924.)

synopsis, for Plato referred to the philosopher as δ σύνοπτικός
δialektικός.¹⁰ From this, one might reasonably expect that

an historical study of synopsis would demand a thorough historical consideration of philosophical method as it has appeared throughout its history. In the writings of some philosophers, however, methodology itself has been considered as a problem, and it is from them that one might expect most light on the synoptic method.

Plato says, in the passage referred to, that the synoptic mind is the dialectical; thus in studying the dialectical method it should be possible to find out what Plato means by synopsis. He often says that we must see individual particular things as wholes of parts and as parts of wholes,¹¹ and though he does not apply the term synopsis to these views, they have much in common with our knowledge of reality as this is gained in dialectic. In dialectic we are led beyond the bare particular through the self-development of notions. This is seen, for example, in the Sophist, where it is shown how every idea implicates all the others. This onward-moving of the dialectic, which is well described in the Seventh Epistle, leads on to a "sudden flash"¹² in which all the objects of the world are made intelligible by the dialectic which is

¹⁰ Republic 537 D.

¹¹ Gorgias, 503 e-504 a ; Charmides, 156 ; Phaedrus, 270 ; Lysis, 933, 935; etc.

¹² Ep. vii, 344 B.

the complete synopsis of the world as an organic whole.

In ancient science the synoptic procedure seems to have been most highly developed by Hippocrates¹³ and Aristotle.¹⁴

Though neither uses the word synopsis, their emphasis on the necessity of seeing each organ of a body in its essential relationship to the whole is clearly synoptic in intent.

Aristotle was particularly concerned to show how a unitary thought can refer to a thing which is single but not simple.¹⁵

He clearly saw that discursive judgment was inadequate to a complete knowledge of the individual, and he indicated the necessity of a kind of intuition of an individual,¹⁶ but he nowhere developed this notion clearly enough to stand out as an important and unambiguous contributor to the delineation of synopsis as a method of philosophy.

Sorley¹⁷ and Brightman¹⁸ have referred to Spinoza's scientia intuitiva as synoptical. This intuitive science moves from the adequate idea of a formal essence of an attribute to the thing, and is necessarily true.¹⁹ Never-

¹³ Prognostic, c. xxv. (Jones transl, Loeb. library, vol. ii, p. 55. Cf. Moon, Hippocrates and His Successors (London, 1923), p. 27.

¹⁴ De Part. An., 641a 14 -17, 645 a 30-37.

¹⁵ Ibid., III, 6. Meta., 1023b 12, 1052a 15.

¹⁶ Meta., 1036a.

¹⁷ W. R. Sorley, Moral Values and the Idea of God (N.Y., 1921), p. 255.

¹⁸ Brightman, op. cit., 28. ¹⁹ Ethics II, prop, xl, schol.

theless, Spinoza himself did not use the word synopsis in reference to this knowledge, but he does insist upon its applicability to individuals instead of merely to abstractions.

In Kant's writings there are two references to what may be considered synopsis in Plato's sense, or perhaps in a wider sense. Brightman and Sorley, in speaking of Spinoza as a synoptist, also refer to Kant's Vernunft as synoptic. More important for our study, however, is Kant's use of the word synopsis. Kant says,

If each presentation were completely foreign to every other, standing apart in isolation, no such thing as knowledge would ever arise. For knowledge is [essentially] a whole in which representations stand compared and connected. As sense contains a manifold in its intuition I ascribe to it a synopsis. But to such synopsis a synthesis must always correspond; receptivity can make knowledge possible only when combined with spontaneity. Now this spontaneity is the ground of the threefold synthesis which must necessarily be found in all knowledge. 20

Synopsis here appears as a passive content, a product of synthesis, being the presentation of a manifold of data in a single complex content. In the doctrine of the Analogon of Intuition, Kant outlines a synoptic methodology in showing that for synthetical judgments in which there can be no intuition (i.e. for dialectical judgments), there must

Critique of Pure Reason, A 97. (Smith translation)

be an analogon. "This analogon is the idea of the maximum in the division and unification of the knowledge of the understanding under one principle."²¹ "The idea of a whole of cognition according to principles must impart to our knowledge a particular kind of unity, that of a system, without which it is nothing but piecework...."²² The purpose of the analogon is the creation of a community of ideas in a whole, and so it serves the purpose of a synopsis now on a dialectical level.

Other important writers to be sure have dealt with synopsis at least in an indirect way, but without use of the word. For the nineteenth century, Merz's history, to which reference has already been made, deals with all the writers on synopsis as a problem and indicates many of its uses in the philosophical construction of that period.

This short summary of explicit discussions of synopsis by a few important philosophers should serve as an introduction to the modern interest in synopsis and synoptic method. It is with this modern work on synopsis in epistemology that this study is primarily concerned.

4. Synopsis has two roles to play in the theory of knowledge. The first is its "regulative" role in establishing

²¹ Ibid., A 665, B 693.

²² Prolegomena, sect. 56.

relationships among fields of knowledge, and in section 1 some attempts at this kind of synopsis were mentioned. In the recent past, however, the greatest interest in synoptic method has been within the empirical contents of the various fields of the sciences. Modern interest in synopsis is devoted, to a large extent, to its role within the empirical methodology which we may call its "constitutive" function. The main tendency of contemporary thought is an emphasis on empirical wholes, and this emphasis is characteristic, in one way or another, of all conceptions of synopsis. The importance of synoptic methodology within the various fields of science is easily seen in a survey of some contemporary trends.

Thus at the present time there is a psychology of Gestalt (Kohler, Koffka, Wertheimer, et al) and of Ganzheit (Felix Krueger). Tectology (Bogdanow) appears as a science of organized wholes in all their forms. Stern is formulating the principles of a general study of the Person (Personalistik) as a propaedeutic to all sciences of man. Personalistics subordinates "alles, was Analyse und Synthese erarbeitet haben, dem Prinzip der personalen Ganzheitsbezogenheit." 23

General J. C. Smuts has written:

...Biological science must ever keep before itself the standpoint of the whole, without and

23 W. Stern, Studien zur Personwissenschaft: 1. Teil, Personalistik als Wissenschaft. (Leipzig, 1930). p. 31. Note the two types of synopsis in personalistics.

... being fields of knowledge, and in addition, ...
 at this kind of synthesis was mentioned. In ...
 however, the greatest interest in synthesis ...
 has been within the empirical contents of the various ...
 the sciences. Modern interest in synthesis is ...
 to a large extent, to its role within the ...
 which we may call its "constitutive" function. ...
 tendency of contemporary thought is an emphasis ...
 on the whole, and this emphasis is characterized ...
 of all conceptions of synthesis. The ...
 of synthesis with itself, within the various fields ...
 is easily seen in a survey of some contemporary

... at the present time there is a psychology of Gestalt ...
 Koffka, Wertheimer, et al. and of Gestalt (Pavlov ...
 (Bogdanov) appears as a science of ...
 in all their forms. It is formulating ...
 of a general study of the person (Personality) ...
 to all sciences of man. Personalistic ...
 was Analyse and synthesis ...
 dem Prinzip der personalen Ganzheitsforschung ...
 J. G. Smuts has written:

... Biological science must ever keep before ...
 the standpoint of the whole, without and

apart from which all the details -- so far from being recognized as being organic to each other -- are mere loose meaningless items, like the sands of the sea shore, utterly useless for the understanding of that unique unity which constitutes an organic individual." ²⁴

Ritter has taken as the thesis for his important work on biological method the principle that "The organism in its totality is as essential to the explanation of its elements as its elements are to an explanation of the organism." ²⁵

J. B. Pratt has said, "...Physiological activity is found to be not 'molecular' but 'molar'. The meaning of this expression is that we must regard physiology not analytically but synoptically; the whole determines the part rather than the reverse; the concept of the field must be substituted for that of separate pushes and pulls." ²⁶ "Modern ecology", says Professor Bews, "realizes that there are many lines of approach to the study of living phenomena. It always keeps the necessity of viewing life as a whole well to the forefront." ²⁷ Thomson and Geddes say:

Of recent years the scientific outlook has become more synoptic, trying to take account of

²⁴ J. C. Smuts, Holism and Evolution (N.Y., 1926), p. 231.

²⁵ W. E. Ritter, The Unity of the Organism (Boston, 1920). 2 vols. vol. 1, p. 24.

²⁶ J. B. Pratt, "The Present Status of the Mind Body Problem." Philosophical Review, xlv, 1936, p. 158. See below, p. 77.

²⁷ J. B. Bews, Human Ecology (Oxford, 1935), p. 3. As we shall see later, it is only in a somewhat peculiar sense that ecology sees the organism as a whole.

all the orders of facts -- such as matter, life, and mind. It seeks to see things whole; in other words, the analytic scientific outlook is giving place to the synthetic and philosophical." ²⁸

Burkamp writes:

Es ist in der Medizin heute eine Bewegung zugunsten ganzheitlichen Denkens vorhanden. Ihren drastischen Ausdruck findet sie in dem Wort: Bisher saßen im Wartezimmer des Arztes kranke Lungen, Mägen, Gebärmütter, usw.; wir haben aber den ganzen kranken Menschen anzusehen, zu beurteilen und zu heilen. Untersuchen wir den gesunden Sinn dieser Forderung genauer, so finden wir eine Verflechtung der Synopsis sowohl mit Totalkausalität als auch mit Partialkausalität. Wir lassen als banal den Sinn der obigen Sentenz beiseite, dass Leben und Gesundheit des ganzen Menschen das selbstverständliche Ziel der ärztlichen Behandlung ist und die Erzielung einer angemessenen Funktion des einzelnen Organs einzig an diesem Ziel zu messen ist, nicht selbst vollgültiges Ziel eines Virtuosenstückchens des Arztes sein darf. Wir haben aber zweitens den Sinn, dass der Kranke synoptisch zu betrachten ist. Jeder anormale Zustand, jede anormale Funktion eines Organs, jede normale Eigentümlichkeit der Konstitution, der Reaktionsweise des Kranken kann entscheidend werden für richtige Diagnose, richtige Vorgussage des Verlaufs und richtige Behandlung." ²⁹

²⁸ J. A. Thomson and P. Geddes, Life (2 vols., N. Y., n.d.), vol. ii, p. 1114.

²⁹ Burkamp, op. cit., pp. 342-343. "Totalkausalität" and "Partialkausalität" are distinguished as follows: "Totalkausalität kann Bewirkung des Zustandes eines Ganzen oder Bewirkung durch ein Ganzes bedeuten. Partialkausalität kann Bewirkung des Zustandes eines Teiles und Bewirkung durch einen Teil bedeuten." (Ibid., p. 136.) Cf. also Goethe's statement: "Die Medizin beschäftigt den ganzen Menschen, weil sie sich mit dem ganzen Menschen beschäftigt."

The preceding examples of "organismic" or synoptic methods have been taken from the sciences of life. There is a similar movement in other fields of inquiry. Chemists long ago rejected the notion that even in their work on "inorganic" matter they were dealing with "unorganized" matter. The discovery of isomerism over a century ago clearly showed the necessity of a distinction between composition and constitution.

In physics, Whitehead, Bohr, and Planck are moving towards an organic view of nature. The theory of relativity must be regarded as synoptic to the extent that a whole in knowledge (frame of reference) is the condition for the determination of the part-events. Quantum mechanics is preeminently a science of discrete organization. F. S. C. Northrop has said,

There is something in the realm of atomic physics, as it bears on the propagation of light, which refuses to be resolved analytically into nothing but the microscopic atomic particles built up into more complex structures as bricks are added together to make a house. Briefly, the purely analytic approach to nature has broken down. The relation of the microscopic atom to light and to its neighboring particles is as fundamental as the particle itself; the one conditions, and is conditioned by the other. Field or macroscopic as well as atomic causes are present. ³⁰

The social and the Geisteswissenschaften are becoming more and more synoptical in their aims and methods. In economics the works of Othmar Spann express so extreme a reaction against

³⁰ F. S. C. Northrop, Science and First Principles (N. Y., 1931), pp. 138-9.

individualism that, while synoptic in aim and sometimes in method, its result is actually one-sided. A. H. Wheeler is seeking to reorient school curricula along the lines of the general implications of his "organic logic" or synopses. T. E. Lawrence spoke of military strategy as the "synoptic regard" for the ends of warfare, "seeing each part relative to the whole." Tactics were regarded by him as merely technical means. ³¹

In history and historiography, Paul Menzer writes, "...So werden wir, wenn wir den Blick auf die uns überschaubare Geschichte eines Volkes richten, zu einer noch höher führenden Verwendung des Ganzheitsbegriffes geleitet." In the unity of nature, of life, of psychical experience, and of history, "...sehen wir uns zurückverwiesen auf die Anschauung von einem Ganzen, d.h. auf eine intuitiv gewonnene Gesamtschau." ³²

In aesthetics there is a similar demand for synopsis. It is a commonplace that a work of art is a whole, "an organism", and must be seen as such. ³³ Thus one important role of aesthetic synopsis is its domination in the aesthetic response; but synopsis also plays an increasingly important role in the method of Kunstwissenschaft. F. Adama von Scheltema wrote in 1933 that though aestheticians and

³¹ T. E. Lawrence, Seven Pillars of Wisdom (Garden City, 1935), pp. 191-192.

³² F. Menzer, "Die Kategorie der Ganzheit", Schollers Jahrbuch, 60. Bd., 1936, pp. 17-18.

³³ This is true at least of western art.

historical students were constantly driven to considerations of the problems of wholeness and its appearance in various styles, they were "not very conscious of it" and had no proper concept of wholeness.³⁴ The same year, however, Friedrich Kainz was seeking to make such terms as whole and Gestalt take on a more definite meaning in aesthetics. He broadened the concept of empathy beyond the limits set by Lipps so as to make it fit in with an apperception of personality in Stern's sense rather than in the limited sense of human personality. This is Kainz's "constitutive" synopsis in aesthetics. His regulative synopsis, concerned not with individual works of art but with aesthetics as a science, is to oppose abstract aesthetical theories which would limit the categories of the science to single qualities such as pleasure or form. His synopsis demanded an integration of aesthetics in a system of philosophy:

Nach der analysierenden Differentiation, dem spezialistischen Tatsachensammeln, die noch vor kurzem alle Wissenschaften beherrschten, macht sich jetzt ein Bedürfnis nach Synthese, Integration, und philosophischer Betrachtungsweise geltend. Der Sinn für das Ganze der Philosophie ist neu erwacht, und dementsprechend wird eine neue Verankerung der Aesthetik im Mutterboden der Philosophie erstrebt.³⁵

5. Plato aptly describes the soul of the philosopher as "ever longing after the whole of things both divine and

³⁴ F. A. v. Scheiterna, "Ganzheit und Form in der Kunstentwicklung!" Ganzheit und Form (Berlin, 1932), p. 37.

³⁵ F. Kainz, Personalistische Aesthetik (Leipzig, 1932), p. 3.

human." ³⁶ Philosophy does not have to undergo such a revolution as the sciences are now suffering in order to assert and to make good its synoptic claims. Philosophy of the recent past, it must be admitted, has had a tendency to emphasise the minutiae of logic and history, but to be adequate philosophy must also be synoptic and comprehensive in its aim. Philosophical synopsis does not exclude these more detailed investigations of the fine points of its various disciplines; rather it means the integration of all methods and results in a single picture of the world. Philosophy as the executive and directive endeavor in knowledge has as its essential purpose the integration and interpretation of more special detailed views.

The synoptic and systematic ideal of philosophy has been recognized throughout its history. Recently, Whitehead has said, "It is the ideal of speculative philosophy that its fundamental notions shall not seem capable of abstraction from each other." ³⁷ This is likewise the ideal, as we shall see later, of mathematics and some of the sciences; but the philosophical system differs from these others in that, in addition to being systematic and logical, it must refuse to be abstract. The scientist achieves systematic elegance by abstracting from that which refuses to be

³⁶ Republic, 486 a.

³⁷ A.N. Whitehead, Process and Reality (N.Y., 1929), p. 5.

exhausted in his two-by-four categories; but this easy expedient is not open to the philosopher if he is to be anything more than a manipulator of words.

There must be, however, a certain reciprocity between the synoptist and the specialist within philosophy itself. Here again the research workers in the sciences furnish some of the material which the philosopher uses in his interpretation of the world. But the philosopher, in his turn has an obligation to the specialist:

In so far as philosophy succeeds in reaching a concrete conception of a globus intellectualis it has something to offer in return to the scientist who is seeking for a clearer view of the wider bearings of his own results. For this synoptic vision of the whole, if concrete, will include the parts, assigning to each of the special inquiries its proper place, and exhibiting its more general significance as contributing to the determination of reality.³⁸

6. The fundamental questions of the present essay may be briefly stated as follows:

- (1) What are the essential characteristics of synopsis?
- (2) What methods deserve to be called "synoptic"?
- (3) What are the presuppositions of an assertion that synopsis gives true knowledge?
- (4) What is the relation of synopsis to naive experience,

³⁸ J. E. Creighton, Studies in Speculative Philosophy (N. Y., 1936), p. 145.

abstraction, description, analysis, and synthesis?

A glance at the literature cited in this essay will indicate that a great deal has already been done towards formulating answers to some of the questions which are being asked here. Many considerations of synopsis, however, have been mere by-products of other investigations in philosophy and science, and frequently, even in some of the most important discussions, the word synopsis has not been used. Thus far there has been no exhaustive work on the subject of synopsis and synoptic method as such.

In the present chapter the current importance of synopsis has been shown, together with some slight references to its treatment by earlier philosophers. In the following chapter, it is proposed to study the psychology of perception and of thought in order to give and to defend a definition of synopsis and to ascertain its varieties. In chapter III the metaphysical and epistemological presuppositions of the validity of synoptic methods will be sought and examined; and in chapter IV abstraction, analysis, and synthesis as ways of knowing will be examined in their relations to synoptic method.

The method which is being employed here for the study of synopsis is itself synoptical, since the problem is seen as a whole in itself, but also as a part of a wider context of philosophy in general. To examine synopsis by a synoptic method might be called a hysteron proteron, because it is

just that method itself which is sub judice. It would seem to be no more just than to allow a defendant to try his own case. In the carrying out of the investigations reported here, however, it became obvious that synopsis was pre-supposed in whatever method might be used.³⁹ To eschew synopsis here, then, would be not only undesirable but indeed impossible. The objection referred to is not peculiar to this problem, for every epistemologist must start from something he does not doubt, at least for the time being. If methods concern us, as here, we must still have methods to study them. One may say with Hegel that the distrust of methods which masquerades as skeptical wisdom shows itself to be no better than ignorance, for both effectively prevent all beginnings.

Throughout this essay, it should be borne in mind that the most immediate concern is with the problems of synopsis, rather than with synopsis as it appears in any particular field of knowledge. In other words, our aim is epistemological and formal rather than scientific and material.

³⁹ See below, chapter IV.

CHAPTER II

THE NATURE OF SYNOPSIS

A. Definition of Synopsis

1. The word synopsis has been given many meanings, and many other words have been used which seem to have quite the same meanings. It is necessary to examine some of these meanings of the word, then to give a critical definition of it, and finally to examine some other methods to see if they, too, may be called synoptic.

Obviously, most definitions of synopsis center about the concept whole. Though this concept may itself be indefinable, it is sufficient to point out that we use the word to mean a thing or a complex of things in certain relations which make it possible that that thing or complex of things may be referred to by a single term. Within this general meaning, two more particular meanings may be recognized, though they cannot be sharply sundered. We apply the word whole to an object of knowledge when it satisfies the general criterion of wholeness just given. This meaning of the word corresponds

to the Greek *ὅλον*, and often to the German das Ganze; it appears in such titles as Loeb's The Organism as a Whole and Driesch's Das Ganze und die Summe. The second particular meaning of the word whole is not very common in English -- that is its application to conceptual systems of high integrity. ¹ It means about the same thing, perhaps, as the Greek *κκθόλον*. ² When the adherents to the coherence theory of truth say that the aim of knowledge is organization into a whole, a system, or a concrete universal, the term whole has at least the second connotation, if not the first too.

In chapter I "regulative synopsis" was distinguished from "constitutive synopsis". By the former was meant the organization and survey of fields of knowledge, and the second, the recognition of the wholeness and "togetherness" of objects within the several fields of inquiry. Most succinctly it may be said that the two meanings of the word whole correspond to these two meanings of the word synopsis: whole means a regulative idea with reference to the organization of know-

¹ The New English Dictionary, x, pt. ij, recognizes this meaning of whole as "complex unity or system." Several philosophers have used the word in this sense. Hegel's "The truth is the whole (Ganze)", is typical. Cf. Bosanquet, Implication and Linear Inference, pp. 7-8.

² Plato writes, "... There is an art of poetry ... as a whole" using the term *ὅλον*, however. Ion, 532 C. He is referring to poetry as a whole of abilities, but also as an art which is an object of knowledge. Every science, he says, is a whole. Strictly speaking, *κκθόλον* is "concrete universal".

ledge, and a constitutive category with reference to the organization of objects of knowledge. Both of these meanings of the word must be kept in mind when synopsis is to be defined, for wholeness of view is necessary, and this wholeness must refer to an object which is a whole if synopsis is to be valid. Without both of these conditions, synopsis cannot be distinguished from mere comprehension, and the synoptic mind could only be the mind with a large amount of information. Undoubtedly the synoptist should have wide comprehension, but the word comprehensive is sufficiently descriptive of this qualification. Synoptic refers to something more.

It must be admitted that the integrity and unity of the object, which has just been said to be one of the conditions of synopsis, may be very low, and even given to the object by the subject. Thus Burkamp goes so far as to say, "Intuition, Synopsis, bedeutet nicht objektiven und objektivierenden Abschluss in einem Ganzen, sondern Hinausgehen über zu enge, zu kleine Ganzheiten, erst recht selbstverständlich über das Elementare." "An sich ist zwar den Sinn einer anschaulichen synopsis nicht an abgeschlossene Ganze gebunden. Die Mannigfaltigkeit unserer Umgebung ist ein typisches Objekt der Synopsis."³ One may conclude from this that, in Burkamp's

³ Op. cit., 341, 63. The New English Dictionary cites a similar use: "The Knock of Caleff commands a synopsis of all that is beautiful around." - Baddley, Highl. Scot., 68. (1861)

view, any object is, or many objects are, subject to a synopsis whether it or they constitute a metaphysical whole or not. The integrity which the object or objects may have is amenable to explanation in terms of the integrity of the view in which they are seen, and we have no guarantee of our "knowledge" of individuality or wholeness.

Merz sometimes defines synopsis as "seeing things in their Together."⁴ Though it must be admitted that synopsis does this, the implication of the definition is prejudicial against any theory of wholes or complex individuality, for it neglects or even implicitly denies the discontinuity in the togetherness of some things, and this discontinuity is essential to the assertion of the reality of finite, discrete wholes. It must be admitted that individuality does not seem to be an important category for Merz.⁵

Brightman, and in other places Merz also, define synopsis in a way which gives somewhat more prominence to the category

⁴ J. T. Merz, History of European Thought in the Nineteenth Century, iii, 465 n. and elsewhere.

⁵ For example, Merz says that "the great fact of modern biology" is "that the units of life are not the large visible organisms which were formerly studied by preference, but the innumerable infinitesimal living beings called cells." -- Ibid. ii, 454-455. Thus Merz praises Darwin's theory of gemmules and says that "Darwin has done more to cultivate the vue d'ensemble, the synoptic view of nature ... than any other naturalist of recent times." -- Ibid., iii, 609. More recent writers have criticised Darwin, on the same grounds, as being elementaristic (i.e. not synoptical). Thus Wheeler says, "In biology, Darwin typifies the absurdities of atomism." -- R. H. Wheeler, "Organismic Logic in the History of Science", Philosophy of Science, III, 1936, p. 42. Cf. also Ritter, The Unity of the Organism, ii, pp. 33 ff.

of individuality or wholeness within a larger, more inclusive context. Brightman says that synopsis "means the viewing of any object or complex of objects as a whole."⁶ The thesis of the synoptist is that "nothing is thoroughly understood unless it is seen as a whole and its parts related to its functions and properties as a whole."⁷ Merz writes that to the synoptic view "every object of contemplation, be it large or small, physical or mental, is a whole, a totality, which, in the actual 'together' of its apparent parts, reveals to us something which is lost as soon as we start to dissect or analyse it. In the most emphatic way this view looks also at nature as a whole."⁸

Perhaps the inadequacies of these definitions are largely verbal, for in carrying out their methods these philosophers are vigorously opposed to elementarism, the view that wholes can be accounted for in terms of the parts only. But in their definitions the rejection of elementarism is not clearly indicated, for they do not show that the part, in its turn, must be explained, in some of its appearances, in terms of the whole. If we know a thing only qua whole, we do not know some of its essential features; we must know it also as

⁶ Introduction to Philosophy, p. 27.

⁷ Ibid., p. 114.

⁸ Op. cit., iii, 612.

a part. It is obvious that synopsis is not a method which sees everything merely, or even primarily, as a whole in relation to parts; on the contrary, it is just this which is criticised in elementarism. The anatomist examines a gland; if he is an elementarist he regards it as a whole and as an element ideally explicable in terms of itself and its parts. If he is an organismalist, it is not only a whole to him, but it is more importantly a part of a whole, and it can be understood only in both characters. Synopsis not only works downwards from wholes to parts, but it also works upwards from parts to wholes.⁹ By calling every object or complex of objects a whole, as Brightman does, we are forced to recognize that what is a whole may also be a part of another whole (whole-2). Though whole-2 of which whole-1 is a part may not be empirically given, still whole-1 must be regarded as a part also unless we have reason to suppose that it can be included in no other whole.

2. All the definitions of synopsis agree in saying that synopsis is a view. This is, of course, implied in the etymology of the word, and it has been emphasised against rationalistic attempts to banish intuition from knowledge.¹⁰ Sight

⁹ W.E. Ritter and E. W. Bailey, "The Organismal Hypothesis, its Place in Science and its Bearing on Philosophy." Univ. Cal. Publications in Zoology, xxi, 1938, p. 309.

¹⁰ Whether this intuitive moment is essential to all knowledge or is distinctive of synopsis must be considered in detail later.

is not necessary in synopsis, but, as Kant said, there must be at least an "analogon of intuition." Thus Sorley says, "The philosophical synopsis is a process in which imagination is called in to construct a new intuition, based on the facts laid bare by analysis, but imitating the togetherness or wholeness of perception." ¹¹

In view of the definitions and criticisms which have been given, it is now possible to formulate our own, and on this definition further discussion will depend.

Synopsis is the way of knowing which is the cognition of an object essentially as either a whole or a part of a whole or both.

As a discursive process, synopsis involves regarding a description of an object as adequate only when its wholeness and its partiality are taken into account. ¹²

Several comments on this definition are necessary. First, it must be observed that the definition includes the meanings already distinguished as "regulative" and "constitutive".

¹¹ Sorley, Moral Values and the Idea of God, p. 260.

¹² One might say, "if the object is a part and a whole." That is to say, synopsis is the recognition of its partiality or its wholeness or both. "Nature as a whole", the universe, or the world are sometimes regarded as synoptic objects though they are not parts. The absolutely simple, on the other hand, is not regarded as a synoptic object. Reasons for this will appear when we come to discuss the meaning of simple. Cf. page 220f.

The difference between the two lies in the "regulative" and "constitutive" wholes to which reference is made. A system of knowledge serves as a regulative whole and thus guides a regulative synopsis of various fields of knowledge or the organization of many ideas and items of knowledge into a systematic unity. It may itself be known as a whole and then studied as an object of a constitutive synopsis.

Second, it is necessary to emphasize that description itself may be properly called synoptical. The results of the "synoptic way of knowing" cannot be sharply separated from their expression in synoptic description. Atomism in physics, the cellular hypothesis in its extreme forms, and the theory of the gene are not synoptical descriptions, because in themselves they have no way of accounting for the partiality of the atom, the cell, or the gene. Though a classical physicist may say, "Yes, the atom is a part of the molecule," this partiality is not regarded by him as an essential feature of its nature.¹³ Similarly, the membership in a body of a cell is not regarded in the elementaristic theories as indispensable to the explanation of the cell, for the cells themselves are supposed to be the determiners of the tissues.

¹³ Whitehead, though, has argued that membership in a body of a certain type should be regarded as a causal ground of the behavior of an electron. He recognizes that to assert this and to take it seriously in research is to surrender materialism (elementarism) for "the alternative doctrine of organism." -- Science and the Modern World, (N. Y., 1931), p. 116.

In some experiences which are largely intuitive or immediate, the "synoptic description" may be lacking because no symbolic communication is wanted, needed, or given. This is the case in much of our ordinary sensory experience in which we are not highly reflective; especially is it true of aesthetic experience. But the aesthetic judgment that a certain objet d'art is suitable or unsuitable is a short-hand statement that a given whole is regarded not merely as a whole but also as a part of a wider value-context. Literary skill, perhaps, involves as an essential feature the ability to make synoptic descriptions of immediate intuitions which defy ordinary discursive communication.

Finally, the word essentially in the definition requires a preliminary explanation, the complete elaboration of which can be given only in the next chapter. By saying that an object is regarded essentially as a whole or a part or both, I mean that in synopsis an object should not be torn out of its relations to its parts and to wholes of which it is a part. To illustrate, a bee cannot be understood, says the synoptist, if we do not observe it in relation to its swarm (the whole of which it is a part) and to its organs. At different times and for different reasons it will be regarded as partial and integral. The ecologist will consider it a part; the physiologist is interested in it as a whole. The bee is always both whole and parts; and to know it completely or even to know it

well enough to have practical dealings with it, we must know it as both.

B. Sensuous Synopsis

3. It is neither possible nor desirable to separate sensuous experience from thought, but for the sake of discussion we may emphasize the sensuous element or moment in knowledge and neglect, to some extent, the ratiocinative or formal aspect of knowledge. This we shall do in the present section, and thus we shall be concerned with constitutive, sensuous synopsis.

In sensuous experience, synopsis is the apprehension of a complex object, i.e. one which gives a stimulus (to a sensing subject) made up of many simultaneous or successive "stimulus moments", yet one which is cognized as a single thing.

Whether there is any objective criterion of individuality and hence of a complex object must, at this stage, be left undetermined, and this definition of a complex object must suffice for the present. The definition of a complex object just given merely asserts that by regarding certain contents of experience (corresponding to stimulus moments) as subordinated in significance to others, a "complex object" is cognized. From this phenomenological fact of subordination we cannot infer to any metaphysical individuality of the so-called complex object; but the complex object can be said to appear to be one object and so to have an epistemological

or phenomenal individuality, even if not metaphysical or cosmological reality as a complex whole.

4. The conflict between the synoptists and the elementarists arises when one asks concerning the nature of the processes underlying the cognition of a complex object. McDougall has formulated what may be regarded as the thesis of the synoptist in the psychology of perception:

The complex object is thought of as a whole or unity comprizing many parts; but the act of knowing or thinking the complex whole is a single act, though it may prolong itself through successive phases. In the total process the various sense-impressions composing the sensory pattern play their parts, contributing to the total unitary resultant. But the synthetic activity does not consist in merely holding or binding together a number of discrete sensory elements. The thinking of the object is a unitary act, a psychic response to a multiplicity of stimuli. ¹

The synoptic act has a unitary complex object. But as the object is not simple, in what sense can the act itself be a single unitary experience? The object which is synoptized and seen in the "total unitary resultant" may be extended in time (as a melody) or it may be given all at once (as a small spatial figure). But every experience, even a simple sensation, has a certain duration. The sensuous experience of the simplest possible type may be almost instantaneous,

¹ W. McDougall, Outline of Psychology (N. Y., 1923), pp. 263-64. Sturt (Principles of Understanding, p. 82) speaks similarly of perception of a complex object as "synoptic, schematic, and coactive." - Cited in C. A. Bennett, A Philosophical Study of Mysticism (New Haven, 1923), p. 94.

extending only just beyond the temporal threshold of nerve excitation; and though the experience may be prolonged, in so far as its duration is not instrumental to a growing differentiation and integration within the experience of the object, its unity (by virtue of its having one object) and its continuity do not earn for it the name of synopsis.²

On the other hand, extension of an act of cognition in psychological (not chronometer) time is not necessary to all synopsis. To attribute the unity of the experience of a rhythm to immediate memory of the just-past is to neglect the sensuous immediacy and unity of the experience. If change were not perceived in a psychologically present, coexistent complex experience, and changes were only discoverable by comparison of two discrete states of rest, it is likely that the category of change would never have arisen.

It is my contention here that duration in psychological time of an act does not militate against its singularity, nor lack of extension (through several psychological presents) against its complexity. A temporally extended experience is synoptical if the growing differentiation within its span is

² Here is an important point. Aristotle says, "An act of Sight is thought to be complete at any moment; that is to say, it lacks nothing the accession of which subsequently will complete its whole nature." Thus he denies that Sight is a process, i.e. a Movement. Ethica Nicom., I, iv. Sight is here comparable to what I mean here by mere awareness, as of a sensation; synopsis is not a simple, though extended, awareness.

integrated by or within a single complex cognition.

5. Regardless of whether the act is extended in psychological time, the concept of stimulus-moment is essential to its synoptic nature. Though McDougall does not use the word he is clearly distinguishing, in the citation on page 31, between the stimulus of the object and the stimuli which acquaint us with parts of it or qualities of it. It is here that we must seek the fundamental difference between the synoptic and the elementaristic account of perception, rather than in the nature of the psychological duration which is recognized in perception. The response of an organism to a sound is not a sum of part-reactions to a sum of part-stimuli, but is a unitary complex response to the sound as a single complex object. Physiologically it is quite right to speak of a single note in a symphony as a stimulus, but this is not in the same sense that one says the symphony was a stimulus for writing a book, studying music, or falling in love.³ The proper term in the psychology of perception, at least, for the first is stimulus-moment, and the term stimulus should be reserved for the complex

³ Experiments have shown that a subject conditioned by a single tone does not react to it if it is included in a melodic whole, but does react to it if it is isolated or included in a non-harmonically related tonal mass.

meaningful whole of the object of naive and synoptic apprehension.⁴ The stimulus, if taken as equivalent to a physical element of nerve stimulation, is as much an abstraction as a sensation independent of the perceptual field and supposed to be uniquely correlated with the "stimulus." If the distinction between stimulus and stimulus-moment is neglected, either confusion in description or a denial of the reality of complexity of the object must result, for the subjective awareness of the complex is then regarded as a sum of "awareness elements" and "relation elements", and its phenomenal continuity, integration, and immediacy are sacrificed for an aggregate of independent elements and sensations.

The original given wholeness or togetherness of immediate experience is a fact with which psychology must reckon, but instead of its being a real problem, it should be counted an axiom, a fundamental fact. From it elementary sensations, feelings, etc. are derived by a process of drawing distinctions and making isolations; it is not built up by an aggregation of these elements. Within the experienced whole, there is a normal salience of some parts, a contrast between some

⁴ William Stern, Allgemeine Psychologie (Haag, 1935), pp. 146-147.

⁵ On these grounds Hume is led to deny the real existence of wholes or complex objects. Cf. Dialogues on Natural Religion, ix. Whether any phenomenalism can escape from this will be discussed later.

complexes and their contexts. Failure to recognize this normal cohesiveness and the "glue-togetherness" of some groups of contents within the more inclusive and pervasive totality and unity of the field of experience leads to the notion (granting an equal physical intensity to all "stimuli") that all items are of equal phenomenological importance. The failure to recognize, in addition to the normal functioning of experience as a whole, the functioning of parts of the contents of experience leads to the failure to distinguish stimulus from stimulus-moment, and thence to the inference that all real objects are simple. The assertion that the objects of experience are not merely single but simple is characteristic of atomism; and if the objects are supposed to be sensations, the view is elementaristic sensationism.

Phenomenologically, the given immediate wholeness of experience is prior at least temporarily to the "elements" which can be isolated from it by "brass instrument psychology." Experience comes not as sums of independent simples, but rather self-consciousness is the prius and affords the content which may be segmented, the resulting "segments" being granted a supposititious self-existence under the same con-

William James, Principles of Psychology (N.Y., 1890).

5. Various theories to account for this will be examined later.

Charles Silliman, Inner Space and Behavior.
Madison, Psychology, 1934. (See also Journal of Experimental Psychology,
 Leipzig and Berlin, 1934, vol. 5, p. 100.)

sation . So long as the psychologist recognizes within experience recurring similarities and contents and names them, his procedure is valid and useful to the epistemologist; but he must never neglect the fact that the contents he isolates and attends to are normally parts of a more inclusive experiential complex whole, and we cannot uncritically argue from what is isolated to what is originally given. William James effectively criticised this neglect in his analogy of this account of experience to the description of a river made up of buckets full of water, but with nothing between them. ⁷

We should not omit consideration of the elements, however. The method of studying them should be that which Dilthey called "descriptive":

Ich verstehe unter beschreibender Psychologie die Darstellung der in jedem entwickelten menschlichen Seelenleben gleichförmig auftretenden Bestandteile und Zusammenhänge, wie sie in einem einzigen Zusammenhang verbunden sind, der nicht hinzugedacht oder erschlossen, sondern erlebt ist. Diese Psychologie ist also Beschreibung und Analysis eines Zusammenhangs, welcher ursprünglich und immer als das Leben selbst gegeben ist. ⁸

That which is elementary for this psychology is experienced.

⁷ William James, Principles of Psychology (N.Y., 1890), vol. 1, p. 255.

⁸ Wilhelm Dilthey, Ideen über eine beschreibende und zergliedernde Psychologie, 1894. (Gesammelte Schriften, Leipzig and Berlin, 1924. vol. 5, p. 153 .)

Im Gegensatz zur äusseren Wahrnehmung, beruht die innere Wahrnehmung auf einem Innenwerden, einem Erleben, sie ist unmittelbar gegeben. Hier ist uns in der Empfindung oder dem Lustgefühl, das sie begleitet, ein unteilbar Einfaches gegeben. Gleichviel wie die Empfindung einer violetten Farbe entstanden sein mag, als inneres Phänomen angesehen ist sie ein Unteilbares.

The "however it may have arisen" in this statement of Dilthey's is the key to the whole difficulty concerning psychological elements. The violet color is, according to the criteria of physiology, a complex stimulus (or content), the components of which might be called stimulus moments. Yet since it is experientially simple, this content has an unimpugnable status in descriptive psychology. To deny this, as some have done, is to confuse the categories of psychology with those of neurology. 10

⁹ ibid., 170.

¹⁰ Titchener, Textbook of Psychology (N.Y., 1928 ed.), p. 135, denies that "the peach-character of a certain taste-blend is a new taste-quality It is not itself a sensation." Titchener obviously means something else by simplicity as a criterion for elements than Dilthey; Titchener used highly artificial methods of isolating contents in experience, and so was able to call some things complex which, for Dilthey and for naive experience, are simple. But Titchener's theory of elements is filled with difficulties. For example, sensations are supposed to be the end-products of analysis, yet sensations have four attributes, i.e. they are analysed into four aspects, and Titchener says that a sensation is nothing but its attributes taken together. Cf. Carl Sahn, "The Relation of Sensation to other Categories in Contemporary Psychology," Psych. Monographs, xvi, 1913, no. 1. 131 pp.

Spencer (Principles of Psychology, sect. 60), Münsterberg ("Psychological Atomism," Psych. Rev., vii, 1900), and Holt (The New Realism, N. Y., 1912, pp. 337-339) have recognized two facts which Titchener more or less neglected, namely, that

The denial of the simplicity of certain contents of naive experience is based on the possibility of a type of introspective technique which, it is claimed, shows them to be complex. The claim for fundamental importance of appearances which are simple in naive experience but allegedly complex in more sophisticated and artificial introspection has been most emphasized in the psychology of the Gestalt-qualities.

6. The emphasis on simple qualities based on complex non-

to have predictive value psychology must distinguish elements which are correlated with the simplest possible physiological processes, and that the fundamental elements so correlated must be all alike or have nothing in common, for having common features means having an at least partially common physiological condition. They all recognize that there is no such disparity or uniformity in consciousness and consequently they admit perhaps the real elements of their psychology are not experiential. That is to say, to explain experience they first explain it away. Münsterberg later recognized the fictional nature of his atomistic scheme. These limitations make further epistemological criticism unnecessary here; suffice it to say that the distinction between appearance and reality, which is made by other sciences using a limited number of categories, cannot be made in phenomenological studies, for in sensing there is not any difference between what appears and what is sensed.

conditions in sensory experience has come, in recent psychology, from the Graz school, but there are indications of the recognition of the fact that there are qualities attaching to wholes which the parts do not have at least as far back as Plato.¹¹ E. C. Boring says:

Nor must it be thought that orthodox psychology had ever taken its creed about elements any too seriously. It was accustomed to do homage to elements and their attributes, as it were, on Sunday, and then to play with what were actually Gestalten all the week. The strength of Gestalt psychology in this regard was that it asked everyone to do what he had for the most part been doing, and that it wished, therefore, to affirm the psychology¹² of actual research rather than to remake it.

Boring is quite right, as can be easily seen in an objection Titchener makes to a statement of Stout's¹³ that "the presentation of a form of synthesis is as distinct from the presentation of the elements combined, apart from the union, as the presentation of red is distinct from the presentation of green." Titchener replies:

This betrays a confusion of the analytic and genetic points of view. We cannot generate the square from lines, or the melody from rhythm and

¹¹ Thaetetus, 203-205.

¹² E. C. Boring, A History of Experimental Psychology (N.Y. and London, 1929), p. 577.

¹³ G. F. Stout, Analytic Psychology (London, 1909), vol. II, p. 48. N.Y.

and scale, but neither is that what we try to do. The square and the melody are given, as perceptions. Our psychological task is to analyse these given perceptions, to discover their elements, and to formulate the laws under which elementary processes combine. That done, we can write for 'square' and 'melody,' 'these and those elements connected in these and those uniform ways,' and we can go on to search for the physiological conditions. We have solved our problem in analytical terms; we have not first defined the terms and then put them together to produce something that was not contained in the definition. ¹⁴

It is very questionable whether Titchener has met the point. We may have put four lines together and have got a square; looking at the square as a whole will reveal its specificity, its form-quality. The specificity of the square must be given in an acquaintance, in the same way that the specific form of a straight line or an angle must be experienced. No amount of ratiocination can move from the peculiar properties of four lines and four angles taken severally to that of a square, even though the geometrical construction is stated. A gestalt-quality may no more be described than any other experientially simple quality. Titchener's shifting from immediate sensory experience to a discursive construction is nothing more than an indication that nothing can be done except to point to an object which arises under "these and

¹⁴ E. B. Titchener, op. cit., pp. 372-3.

those uniform conditions."

Gestalt qualities must be recognized as essential in description if psychology is to deal with experience as it is. A gestalt-quality is just as simple and legitimate an element as the so-called simple sensation. In the interests of elementarism (the theory that the part is the primary real and the ground for the explanation of its complexes, ¹⁵) the legitimacy of claiming for gestalt-qualities a fundamental place in the system of psychological categories has been denied, and the single gestalt-qualities have been subjected to neglect and, more often, misclassification. Thus Titchener claimed that the peach-character of a certain taste was not a sensation or a new quality, but a mere indication of the way real, legitimate sensations are arranged or blended. ¹⁶ Holt argues that a gestalt-quality is "elements plus organization," and he draws an analogy between psychology and chemistry: "Water is indeed more than oxygen and hydrogen, it is these with organization added." ¹⁷

¹⁵ It is the view that "the part is primary and qualities or forces are innate in them." -- R.H. Wheeler, "Postulates for a Theory of Education," Journal of Educational Research, 29, 1935, p. 189.

¹⁶ Titchener, op. cit., p. 135.

¹⁷ E. B. Holt, in The New Realism (N. Y., 1912), p. 340.

Such a statement as this, even if it were true, would be fairly useless for scientific work unless from what is already given (oxygen, hydrogen, and "organization") the product could be predicted by a kind of addition. But it cannot, in psychology or in chemistry. Wundt recognized this in his theory of creative synthesis, but Dilthey showed the effect of this concession of elementaristic psychology when he wrote, "In dem Masse, als diese Bewegung [towards material richness] fortschreitet, muss die erklärende und konstruktive Psychologie an Einfluss verlieren." 18

Holt's statement, like Wundt's principle of creative synthesis, raises a question concerning the "explanatory" sufficiency of an elementaristic psychology. What is the justification for demanding that the whole be accounted for in terms of its parts "with organization added"?

7. Can one say, with Holt, that organization is added to elements? To answer this, it is necessary to develop more fully a notion which has already been mentioned, namely the priority in experience of an immediacy which is subjected to division and segmentation.

The problem is really one of the psychological nature of relations. Is experience a continuous flux in which parts

18 W. Dilthey, op. cit., p. 167.

and relations are discovered or invented, or are relations secondary elements between certain independent prior elements such as sensations? In other words, is the stream of consciousness the primary fact of experience or is it a derivative from sensations and relations? In reference to Holt's formulation of the question, the problem is to determine whether organization is added to elements which are in themselves unorganized, or are organization (as pure relationality) and elements abstractions from experience which is originally a whole owing no such diremption?

Before sensuous experience appears in the form in which it is described by the elementarist, the sentient organism has a vague general awareness of the situation including itself. This is undoubtedly the type of sensory experience characteristic of lower organisms whose sensoria are not well developed and differentiated, if there is sensory experience at all; the content, it seems probable, is simpler, and there is no sharp distinction between the various types of qualities which are experienced. Instead of experience as we know it originating through an integration of data and sense from many sense organs, originally the development occurred by an inverse movement of a disintegration of primitive sensitivity into modalities of sense; in a word, dissociation of a whole rather than association of parts (contents from various sense

departments) into a whole has been characteristic of cognitive evolution. ¹⁹ Evidence of this original sensitivity is of various kinds; the variety of stimuli which affect simple organisms, synaesthesia on higher levels, and the demands which a consistent evolutionary theory makes on psychology require this theory of sensory specialization. That the differentiation of the sense modalities is not complete is shown in synaesthesia, inter-modal sense qualities, and physiognomic perception. ²⁰

F. H. Bradley writes as follows:

We must get rid of the idea that our mind is a train of perishing existences, that so long as they exist they have separable being and, so to speak, are coupled up by another sort of thing we call relations. If we turn to what is given this is not what we find, but rather a continuous mass of presentation in which the separation of a single element from all context is never observed, and where, if I may use the expression, no one ever saw a carriage, and still less a coupling, divided from its train. ²¹

¹⁹ W. Stern, Allgemeine Psychologie, ch. vi.

²⁰ Stern writes of physiognomic perception as follows: "Diese wird erst dort erreicht, wo das erkannte Objekt selbst in seinem Eigenleben wahrgenommen wird. Was ich nun erlebe, an Farbigkeit und Formung, an Tongestalt und Sprachklang, ist nicht nur da als fremdes Ding, sondern ist Ausdruck, Sensensbekundung. Ich sehe, ich höre dem Dinge an, wie es ist -- weil ich es nämlich nicht lediglich mit meinen Augen, meinen Ohren wahrnehme, sondern weil ich mit meiner ganzen Person, durch Vermittlung des optischen bzw. akustischen, seine ganze Existenz erfasse." -- Ibid., pp. 174-175.

²¹ F. H. Bradley, Collected Essays (2 vols., Oxford, 1935), 1, p. 309.

Again:

What is immediately experienced, is not a collection of pellets or a 'cluster', as it used to be called, of things like grapes, together with other things called relations that serve as a kind of stalk to the cluster. On the contrary, what at any time is experienced is a whole with certain aspects which can be distinguished, but, as so distinguished, are abstractions. ²²

Bradley takes as his point of departure the level of immediacy found in feeling, which he regarded as a mass of undivided awareness below the level of relations. There are in this, he thought, variations and differences, but they were always felt within a whole rather than cognized rationally as differences between particulars. Thus he says,

At any time all that we suffer, so, and are forms one psychical totality. It is experienced altogether as a coexisting mass, not perceived as parted and formed by relations even of coexistence. It contains all relations, and distinctions, and every real object that at the moment exists in the soul. It contains them, not specially as such and with exclusive emphasis on their content as predicated, but directly as they are and as they characterize the psychical 'that'. ²³

It is from this non-relational continuum that relations and terms arise through a "falsifying analysis." It is Brad-

²² Ibid., v. II, p. 376.

²³ F. H. Bradley, Appearance and Reality (8th impression, London, 1925), p. 224.

ley's contention that relations are intrinsically contradictory and therefore they cannot be characteristic of Reality. For this reason, he demands a level of immediacy in which the unity of experience is not parted by relations.

If Bradley's critique of relations is justified, we can find in his account of immediacy no support for claiming synopsis, as here defined, to be a valid procedure, for in it relations are of paramount importance. But is Bradley's criticism justified? He makes a disjunction between an unrelated congeries of independent elements and a non-relational continuum of immediacy; and he argues that, since discrimination would be impossible in the former, there being no continuity, which is essential for comparison, immediate experience must be non-relational. This argument is invalid, however, for the disjunction is not exhaustive; it is not obvious that the continuum could not be a relational whole. Bradley cannot talk about it consistently as if it were not, as a matter of fact; for example, there are coexistences and sequences in it, grouping takes place within it, it has reference to its own "satisfaction", and Bradley sometimes talks as though it had objects.²⁴ Bradley's rejection of this alternative is based on the following argument: The

²⁴ F. H. Bradley, Essays in Truth and Reality (Oxford, 1914), p. 179.

held, never goes so far as to become a plurality of discontinuous presentations having a distinctness such as the atoms of the physical world are supposed to have. ²⁵

"... Even when most definite what we call a presentation is still a part of a larger whole. It is not separated from other presentations, whether simultaneous or successive, by something which is not of the nature of presentation as one island is separated from another by the intervening sea, or one note in a melody from the next by an interval of silence." ²⁶

Merz takes the original synopsis of the continuum in ordinary introspection (Selbstanschauung) as the ground of conscious life in general. ²⁷

8. Even if our original experience is of a continuous flow, and even if all our distinctions and relations are embedded in a pervasive continuous whole, still we come to distinguish in it, in some way, relatively isolated parts. These parts I have already referred to as "complex objects"

²⁵ J. Ward, "Psychology," art., Encyclopaedia Britannica, 11th ed., vol. 22, p. 556.

²⁶ Ibid., p. 553.

²⁷ J. T. Merz, "The Synoptic Aspect of Reality," Proc. Durham U. Philos. Soc., vol. 5, 1913, p. 54. In this he agrees with Dilthey, op. cit., pp. 172, 173, 175, etc. R. M. Eaton, in agreeing with William James's "Does Consciousness Exist?", describes our experience of the "stream of consciousness" as "from the beginning ... synoptic." -- Symbolism and Truth (Cambridge, Mass., 1925), p. 291.

and sensations. Cassirer says, "The question here can never be how we go from the parts to the whole, but how we go from the whole to the parts."²⁸ We must now examine the means by which the distinctions in experience which we acknowledge originate. It is necessary to determine whether the types of segmentation which are acknowledged have arisen through a modification of a blank continuum, as Bradley claims, or whether there is not, from the beginning, some relational discontinuity and organization.

An object can be known as a single thing, as a complex whole, only in so far as the stimuli from the various parts of it are appreciated as factors (stimulus moments) of a unitary complex, distinguished from the stimulus moments of its ground or context. This appreciation and differentiation from the ground may take place in two ways; the manifold of sense may be interpreted and subjectively modified by meanings (i.e. by the epistemological subject), or the manifold may be conditioned to form patterns or gestalten in the sensory manifold (i.e. modification by the empirical organism). According to the Gestalt-theory consciousness is never a continuum, altogether without discontinuity, for it holds that the physical stimuli from the environment are dynamically organized by the nervous system before the

²⁸ Ernst Cassirer, Substance and Function (Chicago, 1923), p. 335.

the objects are experienced. It is necessary to discuss both theories of the segmentation of experience.

The theory which has heretofore been most popular has been the "meaning theory" of discreteness. The ball is distinguished as an object, as a whole, by the baby because he sees and remembers having seen a complex of sensations "stick together" in movement, resisting his touch, etc. By association he learns that the complex is one thing, and parts of it become "moments"; they correspond to the stimuli (stimulus moments) which are not themselves sufficient stimuli to "play ball". Now if the child had never had any interest in this cluster of sensations, had not felt the ball and played with it, he would never have differentiated it from its surroundings. In other words, the complex has been separated and organized into a self-existing whole which is not merely an accidental juxtaposition of sensory properties but is posited as a bearer of these qualities, a permanent substance. Suppose, however, that the child first sees the ball as the head of his doll. Ball ceases, according to this theory, to be a whole and becomes preeminently a part of some other whole, because a whole is that in which the baby is interested, and he is interested here not in the doll's head, but in the doll itself as a whole, as a complex stimulus to "play doll".

This theory of organization based on meanings lays the

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... on message like the

entire burden of organization on reproduction, making association the only factor in organization. This theory is never able to account for the facts that children first respond to wholes of some degree of complexity rather than to sensations,²⁹ that familiar forms such as letters can be "buried in" unfamiliar gestalten and not found,³⁰ and that a new field is seen as organized on first appearance. Nor does the principle of association account for the facts of organization in reproduction, as has been shown by the Gestalt psychologists who did not establish the Aufgabe for "automatic" associations.

An experimental result suffices to show some difficulties in the orthodox view. If an animal is shown two squares of gray of relative brightness 1 and 2, respectively, and is taught to react positively to 2, and then is shown two more squares of relative brightness 2 and 3, respectively, he reacts positively to 3, even though he has heretofore reacted to the specific brightness 2. In other words, the animal is reacting to the difference in brightness (a property of an organized whole) instead of to an element of specific intensity.

How are these results to be interpreted? The sensationist,

²⁹ Jean Piaget, The Language and Thought of the Child, (New York, 1926), p. 132.

³⁰ Wolfgang Koehler, Gestalt Psychology (New York, 1929), ch. vi.

of objects rather than representations, mainly
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or are these results to be interpreted? The experimental

The first part of the study was an attempt to show that the
 results of the study were not due to a simple habit of
 responding to the brighter of two lights.

whether like Hume or with a theory of a continuum, would say that in the previous experiences there has been, in addition to the sensations of specific brightnesses, a sensation of difference in brightness. It is sensations of this "relational" type which preserve the continuity of the continuum. James holds, for example, in his radical empiricism that there are sensations of "if" and "but" and the like;³¹ presumably the relation "brighter than" would be a third content in an experience of the two intensities.

To this, of course, would have to be added the sensation "darker than," and soon the sensation becomes unmanageable; its simplicity, which was its only virtue, is seen to be specious. Nor does the theory account for the strange fact that, according to its principles, a relational sensation is always preferred to a qualitative one in learning. Such a theory presupposes an abstractive power higher than we can expect from animals and young children.

The Gestalt psychologists, to account for this and other phenomena which are puzzling if one supposes simple elements to be prior to the whole or the whole to be an undifferentiated continuum, have developed conceptions of "dynamic organization" of contents according to the energy conditions of the brain. Thus in accounting for the phenomena of choice of

³¹ William James, Essays in Radical Empiricism, (New York, 1920), p. 95.

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of difference in brightness, for example, the Gestalt school claims the difference in brightness (intensity) sets up a cortical or retinal tension which is effective regardless of the specific intensities of the stimulus moments, provided only they have a relation of brighter and darker to each other which is conformable to the potential differences within the physiological tension system. This school of psychologists has investigated very thoroughly the conditions underlying the organization of a sensory field and finds that familiarity and expectation ("objective sets") are very weak Gestalt-faktoren in comparison with such factors as "closure," nearness, similarity, "common destiny," etc.

The capacity of the retina and the cortex to respond as a whole (as is necessary in accounting for these facts and others such as Wertheimer's Phi-Phenomenon) is not characteristic of a rigid machine structure, but rather of a dynamic system of tensions. By interpreting these phenomena quite generally, it can be said that a figure on a ground sets up a diffused retinal stimulation in its inner region and this "closes" the gestalt, knitting the pattern closer so that it can be seen only as a whole. To go back to our example, we can say that when the infant sees a ball, there is in the retina a manifold of stimulus-moments which are organized dynamically by the retina and the brain to give the appearance of a single round object, though no similar experience may have occurred before.

... in the Gestalt school ... the difference in intensity ... or retinal tension which is effective regardless of ... the specific intensities of the stimulus moments, provided ... they have a relation of brighter and darker to each other ... is conformable to the potential differences within the ... tension system. This school of psychologists ... the conditions underlying ... of a sensory field and finds that similarity ... ("objective") are very real ... is comparable with such factors as "closure", ... similarity, "common destiny", etc. ... of the retina and the cortex to regard as ... is necessary in accounting for these facts ... as Gestalt's (the phenomenon) is not characteris- ... rigid schemas; however, but rather of a dynamic ... By interpreting these phenomena quite ... it can be said that a figure on a ground sets up ... stimulation in its inner region and this ... the pattern closer so that it ... as a whole. To go back to our example, ... that when the infant sees a ball, there is in his ... of stimulus-moments which are organized ... by the retina and the brain to give the appearance ... though no similar experience may

Gestalt psychology has revolutionized sensory psychology and promises to do so for other fields. Several cautioning words must be said, however; that the Gestalt psychology gives a more accurate account of actual phenomena than the sensationist doctrine did is not to be doubted, but there is a question as to whether the categories of Gestalt theory are entirely adequate as explanatory principles throughout psychology.³² We must ask, does Gestalt psychology with its theory of organization suffice to explain immediate experience, or must at least some of the categories of the older "psychology of the continuum" be used to complete the Gestalt account.

Two attacks on present-day Gestalt theory may be cited. Felix Krueger writes that the Gestalt psychologists

gingen bis vor kurzem einseitig isolierend, ja hypostasierend. So kamen sie zu dem Irrtum, es enstände hier eine durchaus neue, selbständige in sich geschlossene Wissenschaft. Die jeweils übergreifende Bänder wurden schon bei der Erlebnisbeschreibung vernachlässigt, dann theoretisch zerschnitten. Das betraf insonderheit die zugehörigen Sachverhalte von psychischer Ganzheit in beiden hier unterschiedenen Bedeutungen des Wortes [that is, as category and as object]. Mit exakten Methoden und im einzelnen mit schönen Erfolgen wurde fast ausschliesslich das höhere

12 33 It is to be understood that the explanatory sufficiency of a category is but a function of its descriptive universality, i.e. the generality of its content. We are not demanding that description should be "scientific" and explanation "metaphysical."

attempts appears in their own constructive work. It is de-
 Sinnesleben, hier wieder vornehmlich das optisch-
 strahlräumliche auf 'Gestalt-' Faktoren hin untersucht;
 daneben ebenso, aber einseitig im Rahmen des
 Intelligenzproblems das zweckgerichtete Verhalten.
 Zahllose Tatbestände, auch Erlebnisqualitäten von
 ungegliederter, diffuser Ganzheit kommen dabei
 zu kurz; am meisten die motorischen und die emotion-
 alen. Diese niemals fehlenden Bestimmtheiten
 qualitativ, der Erscheinungen, als funktional, ihrer
 Wirkungszusammenhänge. Gestalterlebnisse setzen
 psychische Ganzheit voraus; sie sind selber
 von bestimmter, nämlich gegliederter Art. Alle erlebten Gestalten
 sind zugleich erlebte Ganze, aber nicht umgekehrt. 34

as not to be gestalten at all. (2) The wholeness and
 And Stern writes:
 activity of persons, which is Stern's chief concern, is

Werden die 'Gestalten' zu den eigentlichen
 Grunderscheinungen der Wahrnehmung gemacht, die
 ihre Selbstgesetzlichkeit in sich tragen, so entsteht
 die Gefahr, dass wir -- nur auf einer andern Ebene
 wieder in den Elementenstandpunkt verfallen,
 der gerade durch den Gestaltbegriff überwunden
 werden sollte. Es werden dann eben die 'Gestalten'
 als solche Elemente angesehen, aus denen sich alles
 seelische Leben zusammensetzt, so wie man es früher
 von den Empfindungen angenommen hatte. Deshalb ist
 hier gleich die erste Bedingung erforderlich. Die
 Wahrnehmungsgestalten sind wohl autonom nach unten
 hin: sie geben der in ihnen gestalteten Empfindungs-
 materie ihre Gesetze der Prägnanz, der Vollständigkeit,
 (der Transponierbarkeit. Aber sie sind nicht autonom
 nach oben hin; vielmehr empfangen sie ihre
 Gesetze, ja ihre Existenz von einer übergeordneten
 Prinzip: der Person. 'Keine Gestalt ohne Gestalter.' 35

Without going into the attempts of these critics to cor-
 rect the errors of the Gestalt psychologists, as there at-
 tention or even essential features of normal experience.

34 Felix Krueger, "Das Problem der Ganzheit," Ganzheit und Form, pp. 110-116. S. 111-112.

35 William Stern, Allgemeine Psychologie, pp. 152-153.

tempts appear in their own constructive work, it is desirable to make several observations. (1) Using the principle of weak gestalt, the Gestalt psychologists attempt to account for the phases of experience in which Krueger claims they are most inadequate. Whether this principle is a "domestic" one for Gestalt theory is a very debatable question, and many phenomena to which the Gestalt theorists refer as "gestalten" seem to be so "weak" as not to be gestalten at all. (2) The wholeness and activity of persons, which is Stern's chief concern, is virtually denied by Lewin, who, in effect, says that the rejection of the independence of elements in the person does not, in itself, force one to assert that there is a single metaphysical individual as the subject. The unity of the person, he believes, is less ultimate than the unity of several psychic systems in the person, and the ego seems to be just the dominant system. ³⁶

(3) The Gestalt psychologists are always concerned with psychical structure, but they limit this structural picture of experience by emphasising that the contents of experience cannot be exhaustively analysed into a small number of elements; sensation and atomism by abstraction neglect many nuances or even essential features of normal experience.

³⁶ Kurt Lewin, A Dynamic Theory of Personality (New York, 1935), pp. 55, 56. 61-62.

But the Gestalt psychologists have to defend themselves not merely from the charge of elementarism, but from just the opposite charge too.

Gestalt psychology is said by some critics to repeat the word 'whole' continually, to neglect the existence of parts and therefore to sacrifice that wonderful tool of all scientific procedure, analysis. Nothing could be a more misleading statement, as may be judged from the fact that we found it necessary to mention segregation whenever we were dealing with a unit or a definite whole. In dynamical distribution ... the functional 'interwovenness' of a field is altogether compatible with dynamical segregation. We may even say that in Gestalt analysis we find the genuine 'parts' of the field as segregated wholes and groups, their genuine 'parts' again as subordinated wholes and members, whereas the so-called sensations of introspective analysis are parts existing only in construction and theory. For this reason, analysis as a statement about real parts, existing in consequence of organisation, is a perfectly legitimate procedure in Gestalt psychology, probably much more valuable than any analysis into sensations, which certainly no one finds segregated in his visual field. ³⁷

9. What is common to the classical school of organization by meaning and the Gestalt school of dynamical organization, for our purposes, is this: Any process of analysis presupposes the original unitariness of a complex given. The qualities of the whole, compared to the "elements" which are analysed out, constitute one criterion of the analysis.

37. W. Koehler, Gestalt Psychology, pp. 182-183. Cf. Edna Heidbreder, Seven Psychologies (New York, 1933), p. 374.

Since the complex object may be seen all at once, the gestalt or the meaningful whole as a spatial or a temporal pattern may be synoptized in a psychological present, or if still further extended, in several presents. Synopsis is the ground for the sensory analysis.

The point of disagreement between the two schools of psychologists who recognize the irreducible validity of wholes in experience is, so far as we are concerned, merely in the answer to the question of the origin of experience. Bradley recognizes the teleological organization within a primordial whole of experience; the Gestalt school recognizes dynamical organization within a flux which may or may not be integral, and holds that this organization is dynamical rather than phenomenological, by meaning. Perhaps Ward and Dilthey give accounts of Erleben which mediate between these oppositions, recognizing both the experience of segmented wholes and the continuity of their changes; and there is no reason to suppose both types of organization are not present.

There are some phenomenological features common to wholes constructed by meanings and those due only to dynamical distribution of sensorium energies. Among the most important of these is the gradation of saliency and incorporation. Meaningful wholes as objects are salient, and we have seen in the criticisms of Gestalt theory that the insufficiency of the account given of the imbedded features

of the total "humor" of experience is a serious inadequacy in contemporary Gestalt theory.

Methodologically an important feature of wholes of both kinds is the ambivalence or ambiguity. If some dim lines and vague outlines are shown to subjects, a variety of figures will be distinguished, the particular contents discovered depending in part upon the interests of the subject. Since the possibilities of configuration are almost unlimited, some figures which have reference to the interests of the subjects are looked for or even invented if there is not some "strong gestalt" present in the material. For the most part, however, organization by meaning is secondary to dynamical organization.

10. These methods of experiencing wholes have been worked out in the psychology both of the continuum and of the Gestalt. On the basis of these investigations, it is possible to classify sensory synopses according to the different modes of appearance of the whole and the parts in the synoptic act.

We can distinguish three types of synopsis in sensuous experience: immediate synopsis of a whole in which parts are distinguished subsequently; constructive synopsis in which the parts are given as experientially prior to the whole which is constituted by meaning or interest or enhancing dynamical relationship; and mediate synopsis in

the total "figure" of experience is a certain necessary
contemporary Gestalt theory.

Psychologically an important feature of whole or part
is the ambiguity or ambiguity. It seems that lines

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and discrete syntheses of a whole in which parts

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which the parts distinguished in a whole are reintegrated into the whole which is then seen to be more highly differentiated than in the immediate synopsis. An example of the first in sensuous experience is the perception of a map as a whole and then searching for parts of it; an example of the second would be seeking and constructing figures in cloud pictures; an example of the third would be looking at a map but not recognizing of what country it is, then finding parts, and on the basis of these parts identifying the map as a whole, which is now seen to be a complex whole with greater differentiation and integration and significance than originally was appreciated. Mediate synopsis is readily seen to involve and to presuppose the use of the other two forms with some modification, and only very rarely can one say with confidence that we have only one type of synopsis. Generally it requires some subtlety to discover the type of synoptic perception present. 38

38 The mediate and immediate types of synopsis here distinguished are similar to some other distinctions in the field of sensory psychology. Thus Spearman distinguishes between cognition of complex things as wholes, and cognition that there are items which are parts of a whole. (The Nature of 'Intelligence' and the Principles of Cognition, London, 1937, p. 115.) Line points out that there is a higher degree of integrity in "as cognition" than in "that cognition", and that they normally occur together; which one predominates depends upon context and interest. (W. Line, The Growth of Visual Perception in Children, Cambridge, 1931, pp. 96, 100.) Similarly the early Gestalt theorists observed the difference between "analytic gestalt apprehension" and "synthetic gestalt apprehension." Friedrich Seifert studied the various con-

O. Empirical Methodology of Synopsis

11. From the preceding psychological discussion attention must now be turned to considerations which are more methodological in content and purpose. Once again it must be emphasized, however, that the division of material is neither a hard and fast separation nor merely an arbitrary arrangement. Such a separation is not allowed by the interwovenness of the material, and the continuity with which one ^elevel of the problem develops from another makes the arrangement logical and natural.

A passage from McDougall's description of schematic implicit apperception may serve as a starting point of this discussion. He writes:

The complexity of the conceptual process in

ditions which affect the relative frequency of these two types, and found in tachistoscopic exposure of visual gestalten that the apprehension was analytic ("as") in more than 84% of the cases. (Friedrich Seifert, "Zur Psychologie der Abstraktion und der Gestaltauffassung," Zschr. f. Psychol., 78, 1917, 55-144.) S. J. Beck discovered a correlation between the descriptions given of a figure as a whole (instead of fragments of it) and mental age, using the Rohrschach symmetrical figures as material; Rohrschach reported that feeble minded subjects gave "part answers" instead of "whole answers" in reference to these figures. Cf. Lewin, Dynamic Theory of Personality, p. 221.

the developed mind and the working of a highly complex cognitive disposition may be illustrated by the process of examining such an object as a strange flower, with the purpose of classifying it. A person having no botanical knowledge may merely recognize it as a flower, and perhaps enjoy its beauty. But in the mind of the botanist the disposition which is brought into play by the sight of the flower is highly complex, a system of definitely related parts. If, moved by curiosity, he proceeds to examine the flower, his attention turns from one feature to another, petals, stamens, pistil, ovules, etc., until he has explicitly perceived all these parts and their relations to one another. In this train of activity, the successive acts of perception imply the successive coming into predominant activity of the parts of the total mental system built up by such previous perception of flowers. The whole system is excited from the first; and the systematic relation of the parts governs the order of perceptual activity. The parts may be said to be implicitly apprehended throughout the process, while each part in turn becomes explicitly apprehended. Such schematic implicit apprehension is characteristic of all our more intelligent and purposeful perception. ¹

Several features of this complex process are especially noteworthy. First, there is a perception of a complex whole (the "immediate synopsis") which is articulated and not simple (for there is an implicit apprehension of its parts). Second, there is the perception of the parts explicitly and in their own nature. This is a temporally extended examination, and would be disintegrative and not a single act if there were not an explicit perception of "all these parts in their relations to one another." As these parts in

¹ William McDougall, Outline of Psychology, p. 259.

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light of the flower is already complex, a system
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plant, ovules, etc., until he has explicitly
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conscious acts of classification imply the successive
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The whole system is organized in a
perception of the whole, the whole system is organized
from the first; and the systematic relation of the
parts governs the order of perceptual activity.
The parts may be said to be implicitly apprehended
throughout the process, while each part in turn
becomes explicitly apprehended. Such systematic
implicit apprehension is characteristic of all
our more intelligent and purposeful perceptions.

features of this complex process are especially
important. First, there is a perception of a complex whole
(the "unconscious synthesis") which is articulated and not
atomic (for there is an implicit apprehension of the parts).
Second, there is the perception of the parts explicitly
and in their relations. This is a temporarily extended
condition, and would be distinctive and not a single
act. It is not an explicit perception of "all these
parts in their relations to one another". As these parts in

their relations constitute the whole, together with the form-qualities or emergent properties discovered in the first immediate synopsis (in McDougall's example, the beauty of the flower), the explicit perception of the parts in relations is a mediate synopsis in which a greater complexity in unity is acknowledged.

It is the purpose of the present section to examine synopsis, or this process which McDougall has described as characteristic of our more intelligent perception, in its uses in giving knowledge of various types of sensory wholes. One type of non-sensory whole will be considered, too, on account of its formal similarity to another example.

12. Any machine may be analysed into or constructed from a number of simple machines such as lever, inclined plane, etc. The fact that a complex machine has a form-quality different from those of its parts may be neglected for the present, since it is not the appearance of the machine which is of interest now. It is theoretically possible to predict accurately all of the mechanical resultants of a concatenation of simple machines, and it is possible to analyse, without remainder, any complex machine into its simple mechanisms. By way of illustration, consider an automobile. The automotive engineer can design such a machine and predict its efficiency in performance. He is unable to do this, however, when he considers the automobile

as a whole only in relations to its parts, because movement, which is the function of the machine, is characteristic not of the automobile as a whole but of it as a part of a wider whole which we may call "car and road bed". Linear movement is not an emergent property of a complex whole of machines having various rotary and linear movements, for it is not a property of a whole at all; qua whole there is no movement. It must be connected by means of another simple machine (wheel and plane) to a larger complex within which, now as a part, it does move. Its movement does not depend exclusively on its own intrinsic nature as a whole of parts, but such factors as the coefficient of friction of the road must also be considered.

Here we meet with a fact that will concern us again and again. It is this: if in a whole $(ArBrC)$ in which the relations \underline{r} are all homogeneous (i.e. are terms in one identical categorial scheme), there must be some relation to a broader context (if the whole is not the all-inclusive one) which is not an example of \underline{r} . If $(ArBrC)$ is related to \underline{D} by \underline{r} , $(ArBrC)$ is no longer a whole in the categorial scheme containing \underline{r} but is a part of a whole $[(ArBrC)rD]$. To be an individual whole there must be some relation or property of $(ArBrC)$ which does not hold of $[(ArBrC)rD]$, or some relation \underline{p} such that $[(ArBrC)pD]$ holds, but not

$[(ArBrC)rD]$.

Let us apply this general principle to our example. The automobile may be symbolized as $(ArBrC)$ in which A, B, and C are parts and r is the general type of relation considered under mechanics. But as the relation with the road-bed is also a mechanical relation, it follows that $[(ArBrC)rD]$ is a true proposition, and thus that $(ArBrC)$ is not a whole in the scheme of mechanical categories. Some other relation p must be found in order to assert $(ArBrC)$ to be a real whole. This relation p may, for example, be the relation of the machine to its gestalt-appearance which we originally neglected; the automobile is a perceptual whole. Or it may be a relation to a factory in which it (but not the road) was made, so that it is a historical whole. But it is not a mechanical whole because all of its intrinsic mechanical relations are homogeneous with its extrinsic relations which are mechanical.

Physics is unable to deal with individuals in mechanics in an empirical way, though it can construct what may be called "practical individuals" (i.e. useful machines). It cannot construct mechanical individuals just because the mechanical categories it uses are so abstract and universal that only non-mechanical categories can determine whatever individuals (other than the all-inclusive universe as a machine) are recognized.

Though the physicist can determine the loss of energy in a relatively closed system as well as the permanent effects

to apply this general principle to the example.
The machine may be symbolized as (AABAB) in which A
and B are parts and Y is the general type of relation
under which mechanical parts are related with
the machine. It is also a mechanical relation, it follows that
(AABAB) is a case of position, and thus that (AABAB)
is the scheme of mechanical categories.
The relation Y must be found in order to assert
that the machine is a whole. This relation Y may, for ex-
ample, be the relation of the machine to its parts; or
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of the intrinsic mechanical relations are homogeneous
with the intrinsic relations which are mechanical.
The machine is unable to deal with individual parts in mechanics
in an explicit way, though it can construct what may be
called "practical individuals" (i.e., useful machines). If
we construct mechanical individuals just because the
mechanical categories it uses are so abstract and universal
that they are mechanical categories can determine whatever
individuals (other than the all-inclusive universe as a

of a medium (such as a gravitational field) on a physical system, and thus close a system conceptually, the empirical operation corresponding to this closure, i.e. isolation, is impossible. Only if some properties or relations which are not as universal as those under discussion are assumed is it possible to speak of individuals within a context homogeneous with them in only some respects.

Spinoza recognized this when he reasoned from the "balance of motion and rest" as distinctive of an individual to the entire universe considered as an individual.² Leibniz distinguished an organism from a machine by saying that the organism is organized even in its smallest parts, whereas a (molar) machine can be analysed only to a certain limit (the simple machine). In other words, mechanical properties were assumed to be emergents. While atoms were regarded as little hard bits of matter such an assumption was unnecessary, but after Boscovich's conception of the atom as an intensity-point became accepted, Leibniz's view was necessary. It remained necessary in physics until, by a kind of Copernican revolution in the nineteenth century, molar phenomena were interpreted electro-dynamically, and molar and molecular

² Spinoza, Ethics, III, Lemma vii, Schol.

phenomena again seemed homogeneous. Recently, however, there has been less confidence placed in this formal monism in physics, and it is now generally thought that molar and molecular, or macroscopic and microscopic, regions are not isomorphous. This is shown, for example, in the atomic physicists' impatience with models and with intuition in general, and in the interpretation of statistical methods. Einstein's influence has been felt here, too, in that a relation to an observer is included in physical systems, so that the inhomogeneity of some physical objects may be attributed in part, at least, to the various positions of observers. Thus from time to time, as fashions in physics change, the universality of the mechanical categories, which was dogmatically asserted above, is denied or proclaimed. Within the extension of any set of relations, however, the principles of individuality previously formulated are valid; it is the task of the scientist to discover what are the homogeneous and what are the heterogeneous relationships of the objects he is studying.

13. Logical relations are, however, absolutely ubiquitous. There is no object which can be conceived which is not identical with or different from some other. The fact that there can be only one concrete logical universal has been stated often enough. But it is well to examine the nature of complex

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 ... the homogeneous relationships of the objects

... logical relations are, however, absolutely ...
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subjects which occur in judgment. These may be spoken of as pragmatically or psychologically limited concrete universals, similar to the subjective intensions of classical logic. That is to say, if we are not talking about the universe of logic, some not merely logical restriction on the terms of a judgment must be made. In other words, if (ArBrC) is the subject of a proposition (i.e., "John (who is the son of James)") is the subject of a proposition, some relation p must be found such that (ArBrC) can be regarded as a whole in the judgment so that we shall not have to say that all the terms and relations which might logically be elicited in this categorial scheme constitute the actual subject of the judgment. The relation p is generally, if not always, a psychological relation of meaning. Cunningham has given an excellent illustration of this in the methodology of his essay on meaning. He says:

The method to be followed [in this essay] is partly analytical and partly synoptical. The attempt is made first, to analyse the meaning situation into its more obvious components; and, second, to sharpen the analysis by refining and enlarging it. I call this second step 'synoptical', because, as we shall see, it necessarily involves an appeal to the larger context within which the components of the situation severally stand. If such appeal is admitted as a step of analysis (as I think it generally is, in practice at least), then the method may be³ called analytical without qualification.

³ G. W. Cunningham, "On the Meaning Situation," Contemporary Idealism in America (New York, 1932), pp. 69-70.

This characterization of his method is a fairly general one for all logical investigation. Because of the homogeneity of the "insides" and the "outsides" of a logical subject, the segregation of the subject must be made in terms which are not homogeneous in this way. If the subject were seen only logically (if that were possible for a finite intellect), its segregation as this subject would disappear. Just as the purely mechanical individual can only be the physical universe, or as much of it as is actually mechanical, so the purely logical individual can be only the most general realm of discourse.

14. As another example of a whole in sensory synopsis and the methods of knowing it, reference should be made to some emergent property or gestalt-quality. ⁴ Water is often used as an example. Hydrogen and oxygen, both gases, burn together to form water which is liquid at the temperature at which they are gases. No chemist, however wise, could have predicted the properties of water from a knowledge of the elements of the compound by themselves. But once having seen the production of water or some similar compound from them, the chemist is able to predict what the products of the process will be in the future. ⁵

⁴ The justification for consideration of them together is obvious. Formally they are alike, both being properties which are oversummative.

⁵ Prediction can be made of some properties such as molecular weight, but only if the valence of the elements

The wetness of water, more properly an emergent property than a form quality, is not so obviously a datum of synopsis as a spatial or temporal pattern with its form-quality or emergent. This example is chosen, however, to show that the two cases are analogous and that the acquaintance with an emergent is not methodologically different from that with a gestalt-quality. ⁶

This similarity has undoubtedly led to some confusion. Merz's theory of synopsis involves the thesis. "peculiar to the synoptic view" that synopsis reveals more than analysis can consider. This thesis involves, in its turn, two dogmas: a. Analysis and synthesis are always incomplete; and b. Analysis loses the uniting bond, the Together under which sensations are primarily presented to us. ⁷

Later it will become necessary to examine both arguments, but even here it is necessary to point out the fact that this

is known, and this can be found only through studies of combinations. It must be admitted that many of the brute facts of chemistry can be shown to have a rational ground and at least some of them can be predicted before any experiment with them. For example, knowing certain structures to be generally colored, we can predict that an as yet undeclared compound having in some of its parts this structure will have a certain color. Actually, though, this presupposes some knowledge of the correlation of color with structure, and in this some previous acquaintance with a compound is necessary.

⁶ Notice that here we are not concerned with the problem psychologically.

⁷ J. T. Merz, "On the Synoptic Aspect of Reality," Proc. Durham U. Philos. Soc., vol. 5, 1913, pp. 54-57.

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... is not so obviously a datum of synthesis
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... of the correlation of color is
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... necessary.

is not peculiar to synopsis, unless Merz is prepared to call any, even the most elementary, sensation a synopsis, because sensation has a peculiar property amenable only to acquaintance and not to description, lost when analysis tears it apart, if it is subject to simplification at all. This is not peculiar to synopsis, but is a general characteristic of sensory experience. It is not desirable to degrade the word synopsis to the point where it loses its distinctive meaning by being used to refer to all acts of sensory immediacy.

The failure to see the formal similarity of an emergent to a form-quality is responsible for this statement of Merz's. Because the object of a synopsis generally has a gestalt, Merz erroneously supposed its peculiar nature was due to its grasping a gestalt-quality. But the unanalyzability of a gestalt-quality is no more striking than the unanalyzability of a so-called simple sensation, and this cannot furnish the criterion for synopsis.

It is not the specificity of a gestalt-quality which marks a gestalt an object of synopsis. Discursively, the statement of conditions for a form-quality (as given by Titchener) or for an emergent property (as given by a chemist) is analogous to the statement of conditions (as given by a neurologist) for the engenderment of an elementary sensation.

15. The emergent properties which must now be considered

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... properties which must now be considered

from a methodological point of view are those concerned with life. At present there is a school of biologists, including Ritter, Goldstein, and perhaps the late J. S. Haldane, which may be called the "organismic" school. They agree with Hippocrates, Aristotle, and Kant that the unit of life, the fundamental category of biology, is the organism as a whole. The organism is not regarded by these biologists as the sum of its parts, but rather its parts are thought of as differentiations within it as a whole. De Bary's thesis is typical: "Die Pflanze bildet Zellen, nicht die Zelle bildet Pflanzen." ⁸

Organismic biology has many opponents and has developed in conflict. It may be best understood by comparing it with mechanism and vitalism.

It is very difficult, though, to put one's finger on mechanistic biology. Descartes meant quite seriously, with his doctrine of motion as characteristic of spatial objects, that animal organisms are simply machines and nothing more. It is quite obvious to everyone now that the organism is not a machine in the usual sense -- i.e. a complex of existent-

⁸ W. E. Ritter, The Unity of The Organism, 1, 158. Cf. Eisler, Wörterbuch der philosophischen Begriffe (3 vols., Berlin, 1927), II, 364: "Organologisch ist jene Auffassung welche Dinge und Vorgänge im Sinne des bei den Organismen verwirklichten Verhältnisses des Ganzen zum Teil betrachtet."

ially independent elements each of which is uniquely and narrowly restricted in its movement by the conditions of its construction by an external teleological agent, such as God or an engineer. However explicable such processes as regeneration may be, it is undebatable that it is not characteristic of machine structures. To suppose that the organism is a machine, an apparatus which works, is to neglect the fact that its "structural aspect" or permanent machinery is itself a product of the functioning of the same individual. Anatomy generally has conceived structure in abstraction from function, and only when it becomes developmental (as it now is becoming) is the danger of this abstraction seen and avoided.

It is likely, however, that the majority of professional biologists would call themselves "mechanists", and it is incumbent upon us to seek their meaning of the term and to investigate their methodology. First, it is to be denied that mechanism is merely determinism, as many claim. H. C. Warren wrote, "The distinctive characteristic of mechanistic processes is that the course of events in the sequence is rigidly determined. ... Mechanism represents a generic type; physico-chemical mechanism is a specific type which may or may not exhaust the genus."⁹ In the first place, there

⁹ H. C. Warren, in D. S. Robinson, Anthology of Recent Philosophy (New York, 1929), pp. 562-563.

are theories which are deterministic but which have never, so far as I know, been called mechanistic (e.g., Leibniz's); and furthermore even if this equation were correct, it would not be very informative, since determination and determinism themselves are difficult to define. Apparently such a broad description of mechanism cannot be maintained for long; on the following page there seems to be a surreptitious shift in the meaning of the term, but it is hard to see just how far and in what direction the meaning has changed. At any rate the type of determination which seems to be of interest in biology is "physico-chemical mechanism."

Another thesis presented as distinctively mechanistic must be criticised. W. T. Marvin writes that the mechanist affirms (and the vitalist denies) "that in vital phenomena each instance of discontinuity [i. e. emergence] and each element of every discontinuity is in a one to one correspondence with some chemical-physical configuration."¹⁰ One may object to the term "configuration" as a proper domestic principle of mechanism, but this must be discussed below; it is not apparent that this view can be distinguished from organismic theories, which will be described later.¹¹ The

¹⁰ W. T. Marvin, A First Book in Metaphysics (New York, 1920), p. 249.

¹¹ Marvin himself seems to realize this, but he does not see its effect on his system of categories. Thus he says that the mechanist can deny that there is a fundamental difference between organism and machine not by denying teleology but by attributing discontinuities and teleology to machines.

distinguishing feature of mechanism is a methodological one: it is illustrated (in a particular problem) by a citation Loeb gives from Sachs: "... Differences in the forms of organs are accompanied by differences in their chemical composition, and ... according to the principles of science, we have to derive the former from the latter."¹²

Some implications of this for methodology are quite apparent. Thus the categories of chemistry and physics, rather than those of classical mechanics, must replace categories supposed to be unique to an autonomous biology. "Biology will be scientific only to the extent that it succeeds in reducing life phenomena to quantitative laws."¹³ Woodger¹⁴ points out three theses of mechanism in biology: (1) The organism exhibits no change unless some change first occurs in something else which is not a part of the organism; (2) The parts of organisms are organized in such a way that if certain changes are begun in them certain other changes usually follow; (3) The changes mentioned under (2) are amenable to description as taking place in accordance with the "laws of mechanics" (or physics and chemistry) to a

¹² Jacques Loeb, The Mechanistic Conception of Life, (Chicago, 1913), p. 104. Italics my own.

¹³ J. Loeb, The Organism as a Whole (N.Y., 1916), p. 11.

¹⁴ J. H. Woodger, "Some Problems of Biological Methodology," Proc. Aristo. Soc., n.s., 29, 1929, pp. 341-342.

... of mechanism is a methodological
 ... (in a technical sense) by a
 ... "Difference is the
 ... are accounted by differences in their
 ... and ... according to the
 ... we have to derive the former from the latter."

... of this for methodology as such
 ... the categories of chemistry and physics, rather
 ... of classical mechanics, must replace categories
 ... to be united to an autonomous biology. "Biology
 ... as scientific only to the extent that it succeeds in

... life phenomena to quantitative laws." - Wolfgang Iser
 ... three phases of mechanism in biology: (1) The
 ... change unless some change first occurs
 ... else which is not a part of the system;
 ... of organisms are organized in such a way that
 ... changes are begun in them certain other changes
 ... (2) The changes mentioned under (1) are
 ... as being placed in accordance with

Conception of life
 ...
 ... (N.Y., 1952), p. 12.

close degree of approximation.

In these implications there are several points of interest to the synoptist. First, the abstractness of the view does not make its success indicative of its general validity, for it is quite likely that biology will become more and more "scientific", but its growing scientific¹⁵ by accumulating quantitative data does not show it to be any more valid as a field of conceptions. The fact that a quantitative account of all biological facts might be given does not show that the quantitative approach is most valid or that its theses and implications as developed (but rejected in part) by Woodger are true.¹⁵ It would be most extraordinary if physical and chemical processes had not been found in living organisms, but the success of physico-chemical research does not create a presumption that the organism is just a "chemical engine"; for to make such a supposition it is again necessary to show that such a conception can be made intelligible if the processes produce their own conditions.

A still more important point is to be found in the fact that mechanism claims to be merely elementaristic, i.e. the direction of its inferences is from part to whole. Yet the physicalistic basis which it takes is not an elementaristic one; this was anticipated in the reference to Marvin's use of the word "configuration." It is characteristic of

¹⁵ Cf. R. G. Harris, "Mathematics in Biology," Scientific Monthly, 40, 1945, pp. 504-511.

modern physics and cosmology in general to emphasize gestalt organization. The soap bubble has often been used as an example in physics of a gestalt with dependent moments, instead of being a whole posterior to its parts. We cannot reason from the part to the whole unless we are prepared to acknowledge that the parts are originally found only through an analysis of a whole or an organism; and in this we are recognizing the configuration of the parts in the whole as one of the conditions of the parts' being what they are. Thus the organizer is distributed throughout the animal kingdom, but it is effective only in certain places. ¹⁶ Its chemical identity throughout nature is less important than the role it plays in a whole. In chapter I reference was made to Pratt's statement that physiology must become synoptic, using the conception of field instead of separate pushes. Biology can be mechanistic using this conception, perhaps, but it cannot be elementaristic and employ machine-theory in any narrow sense. ¹⁷

¹⁶ Joseph Needham, Order and Life (New Haven, 1936), pp. 86-87.

¹⁷ "A field is a system of order such that the position taken up by unstable entities in one portion of the system bears a definite relation to the position taken up by unstable entities in other positions. It is, in fact, their equilibrium positions which together constitute the field effect." -- Ibid., 108. A machine is a field in which the positions of entities bear linear relations one to another and in which their instability is restricted to one degree of freedom.

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Actually, it is very doubtful if there has been in recent years a thoroughgoing mechanist, who would hold strictly to a machine theory, instead of to an analogy of the organism to a machine. Those who do follow "mechanism" do not mean by it machine-theory in any narrow sense, but a theory of fields or of general forms of organisms which are not restricted to "life". If the "mechanist" is one who holds physico-chemical explanation to be the only valid form in biology, he is not merely a physicalist in biology, but an organismalist in regard to physics.¹⁰ He has not actually extended mechanistic or rather elementaristic methods into biology, but synoptic methods or organismic methods into physics.

Vitalism differs from mechanism in that it asserts the inadequacy of mere physico-chemical explanation of life processes, and it adds to these factors (which it admits

18 This seems to me to be characteristic of Needham's organicism, which he distinguishes from the "obstructionist" or "dogmatic" organicism of J. S. Haldane, E. S. Russell, and J. Gray. This "legitimate" organicism holds to the functional dependence of parts on whole, the reducibility of life to some chemical organizations, and the universal validity of causation. (Needham's entire notion of biological continuity seems to me to be vitiated by an indefensible ambiguity in the words result and summation as he uses them. (Order and Life, p. 165.) Supposing vital properties to be "latent" in matter, ready to be elicited when "cosmic conditions permit" (p. 157), "organizing relations" (p. 164) must be presupposed. This last concept seems to be utterly without meaning and, what is more, to be without application unless there is organization, which is just the point at issue. Cf. also Ritter, The Unity of the Organism, vol. ii, p. 204 for an amusing criticism.

as necessary but not sufficient conditions for life) some non-physical, non-chemical factor to explain organic regulation and restitution, which are stumbling blocks for mechanism. The vitalist pays a high price for his "explanation" of these functions, though, because while remaining elementaristic (the organism is the product of its parts, or at least the direction of inference is still from part to whole only) he restricts the usual method of elementaristic investigation which is chemical analysis by saying that some parts which must be considered are not amenable to this investigation.

The vitalist seeks the explanation of organic regulation in a factor E (entelechy) or mind; and one suspects he determines its biological function by subtracting all that can be accounted for in physico-chemical terms from the total observed complexity of the organism, then attributing the discrepancy between the two to the mysterious workings of E. The more we know of the physico-chemical nature of the organism the smaller this discrepancy will be, and E is stripped of more and more of its functions. ¹⁹ The vitalist says that the organism is the aggregate result of its parts, one of which is entelechy; the mechanist, generally, says the same but without including the entelechy. ²⁰ The vitalist may be

¹⁹ For example, the discovery of the axial gradient and Spemann's organizer has rendered entelechy otiose in experimental embryology, where it was first used.

²⁰ Note that the mechanist cannot hold the organism to be a physico-chemical individual, for these relations are internally and externally homogeneous. Cf. pp. 63 and 84.

... but not sufficient conditions for life) some
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 ... which are essential for the maintenance
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 ... in the product of an action, or at least the
 ... of substances is still from parts to whole only)
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 ... (ontology) or mind; and one suggests to
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correct in saying that not all processes can be accounted for in mechanistic terms, but he is certainly incorrect in abstracting conditions from effects and attributing the discrepancy to another elementary condition supposed to be different in kind from all the others. The mechanists make the subtraction, but it serves them as a guide for the further investigation; for the vitalist, if taken seriously, it is a limit to investigation.

The chemical and the so-called vital causes should be regarded not as parts of an organism but as abstractions from it which have been hypostatized. To say that the whole is the mere resultant of the parts, or can be considered only in this way, is to fail to do justice to the actual methods of research which the vitalist and the mechanist alike use -- a movement from the whole to the part and then the reverse. ²¹

This way of looking at organic conditions is characteristic of all biological work which achieves any success at all, but the methodology has been given a clear-cut expression and foundation only through recent work by the organismalists. Let it be conceded that organic regulation and restitution are mysteries with which machine-theory and perhaps any mechanism is unable to deal; the organismalist will not attribute these mysteries to the workings of another mystery

E. Causality itself, of whatever kind, involves "mysteries"

²¹ Thus it is not completely true to say, as many have, that all biologists are mechanists in their laboratories. They may all be physicalists, but they are not elementarists; and in the field they are perhaps neither.

and the causal relation of part to part is no more clearly explicable than causation between a whole and a part. For this reason, organismic theories are no more mysterious than vitalistic theories or mechanistic theories; indeed, they seem less so, for instead of attributing "mechanical mysteries" to an alleged "non-mechanical mystery" such as E, they deny the final sufficiency of any elementaristic explanation of the processes of life, and accredit the mysteries there are to the visible empirical whole organism.²²

Biological elementarism is failure to recognize that "unity and integration is not a problem of biology, but an axiom, a master fact to which we must relate all other facts about the organism."²³ We do not find purposive entelechies or minds in mechanical bodies, but rather purposive organisms or wholes, within which (in one case only) we can find a mind or a will.

Organismic biology may be seen in its essential features by comparing it with "cytologism". The cellular theory may

²² In this I disagree with Professor McDougall's criticism of Haldane. Cf. "The Philosophy of J. S. Haldane," Philosophy, xi, 1936, pp. 426-427.

²³ E. S. Russell, "The Limitations of Analysis in Biology," Proc. Aristo. Soc., 1932-33, p. 155. Organicism which thus holds to the "inscrutability" of biological organization is dogmatic or obstructionist, according to Needham. (Op. cit. pp. 13-19.) This theory of "biological biology" (Woodger) holding to the autonomy of biological concepts is generally thought of as a form of vitalism, since it does not acknowledge the complete adequacy of physico-chemical explanation. The methodology of the two organicisms, however, seems to be quite the same.

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 ...connection between a whole and a part. For
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 ...of mechanistic theories; indeed, they
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 ...of any characteristic explanation of
 ...and account the mysterious facts are
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 ...elementary is failure to recognize that "unity"
 ...is not a problem of biology, but an error.
 ...which we must relate all other facts about
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 ...mechanical bodies, but where purposive organisms
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 ...biology may be seen in the essential features
 ...with "cytology". The cellular theory may

...I disagree with Kroton or Kolmogoroff's criticism
 ...the Philosophy of J. B. Williams, "Philosophy"
 ...1936, pp. 122-27.

...the limitations of analysis in biology."
 ...1936-37, p. 122. Organisms which have
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 ...according to Huxley, p. 122.
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be either mechanistic or vitalistic, but it often represents a peculiar emphasis on elementarism which is not essential to either.

Schwann, one of the originators of the cell theory, recognized two possible modes of biological explanation -- the organismic and the elementaristic. His influence was all on the side of seeing the whole as the derivative phenomenon of the parts, but he said that the cause of some organic phenomena such as growth "resides in the totality of the organism."²⁴ But Schwann's followers, whom we may call the "cytologismic school", only regarded the organism as secondary to the cells and explained it by the aggregation of cells. Many cytologists (not cytologismists) now recognize the inadequacy of this principle of aggregation in development and treat the cell as a differentiation within a whole, rather than the whole as a product or aggregate of independent parts.²⁵

Modern criticism of cytologism goes on the Aristotelian thesis, "The whole is prior to the part."

One of the surest aspects of the cell theory was reached when the conception organism was applied to it. Both historically and logically, the organism is made to do duty in interpreting the cell. Whatever validity the conception cell has in modern cell theory, is due in large measure to whatever validity the concept organism has.

²⁴ Quoted in Ritter, op. cit., i, 8. Cf. Merz, History of European Thought etc., ii, 423-424.

²⁵ This seems to have started with Sidgwick and de Bary.

... of the organization of the cell theory,
... the possible modes of biological explanation
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... of the cell theory, but he said that the cause of some
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... to the cell, and explained it by the organization
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... and that the cell as a differentiator within
... than the whole as a product of organization
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... in a letter to the cell.

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But the conception organism was well established long before the conception cell was. Hence the justification of the statement that historically the organism interprets the cell. Organism as an idea is prior and contributory to cell as an idea. That logically also the cell is partly interpreted by the organism is seen in the fact that observers agree in ascribing to the cell the most distinctive features of the organism: namely those of metabolism, reproduction, response to stimuli." 20

This short consideration of organismic method suffices to show its synoptic nature. The organism is looked upon not as a sum of the type $\sum (P_n)$ or even $E + \sum (P_n)$, but rather as a whole in which parts may be distinguished, but cannot be said to be separable and independent, or even thoroughly distinct from one another. Though we generally say the lungs breathe, it is also true to say that the cells breathe, and that the organism breathes. To draw an analogy between biological theory and mathematical notation, which is at best somewhat rough but suggestive, let it be supposed -- and it is natural to suppose it -- that the organism is an internally differentiated continuum, life being a feature of the whole and not a sum of discrete life events. In this continuum there will be certain gestalten of well defined functions such as respiration, alimentation, and reproduction. These gestalten are knit together by dynamical interdependence among certain parts of the continuum which are not by themselves isolated or salient in the stream of life. This accounts well enough for the anatomic features of the organism. The physio-

logical processes are generally not, as we have seen, localized in any single organ or tissue, and we must stipulate the limits of the meaning of any term which refers to a process. 27

In other words, the organic continuum like the supposed psychic continuum is subject to methodological differentiation into parts with other parts, any of which may be called wholes; but we cannot say that the organism is the aggregate of any parts, whatever their nature and relations, because it is not a resultant of any process of addition, concretion, or integration of independent elements. Rather one must say $P = \frac{d}{dp} W$, in which P is a part or process, W is the whole organism, p a relation of meaning or intension or convention, and d/dp is "the derivative with regard to our purposes or meanings, etc."

16. Even organismic biology, however, does not represent the acme of synoptic method in investigation. How far the charge is justified that the organismalist neglects environmental factors and regards the organism as a closed system

27 Hegel's biological theory as developed in his Phenomenology of Mind and Enzyklopaedie, as well as in his earlier works on the philosophy of nature, seem to be very remarkable anticipations, along these same lines, of organismic theory. Cf. Phenomenology (Baillie transl.), pp. 300-301, 293-296; Enzykl., 2nd ed., sections 353, 356 etc.

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... etc."

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... and regards the organism as a closed system

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... of organic...
... pp. 300-301, 303-304
... 300 etc.

is hard to tell. But it may be admitted that some organicists, at least, start out from the continuum of the organism as a whole, and suppose in some way that intra-organic relations which are the objects of physiological explanation are essentially different from and perhaps more important than inter-organic or environmental relations. ²⁸ To correct this view is the purpose of Umweltforschung and modern ecology. ²⁹

Ecology may be divided into two types, experimental and natural. Experimental ecology involves the construction of artificial environments in which factors such as moisture, temperature, illumination, etc. can be varied at will, and the molar and physiological responses of the organism can be observed. In the final analysis, all experimental biology must be regarded as ecological, because every experimental situation is an environment to which the plant or animal responds. Natural ecology is the observation of animal or plant life in its own natural habitat and involves primarily the discovery of natural histories; natural ecology may be said to be almost the equivalent of the old expression, "natural history". The epistemological principles are similar in each. In every ecological investigation we

²⁸ Mechanism, of course, denies this.

²⁹ Cf. W. P. Taylor, "What is Ecology and What Good is It", Ecology, 17, 1936, pp. 333-346.

concerned not with the organism as an isolated whole but as a part of a wider complex whole in which the environment and the organism may be distinguished, but not separated and treated in isolation. "A constituent process of a living thing stands in much the same relation to the organism as a whole as the organism stands to its immediate organic environment."³⁰ The environment can be understood biologically only as the environment of some organism (including the organism investigating it), and the organism is to be understood only in its environment.

But can it be said that the organism in its environment is merely a biological complex in a physical, geographical situation? Undoubtedly the organism is a physical body in a whole with physico-chemical characteristics, but to suppose that this is all it is is to be guilty of the fallacy Whitehead calls "misplaced concreteness",³¹ for the physical world is an abstraction or an extrapolation from the common features of psychological or experiential worlds. Methodologically, the world is physical to a physical object, biological to a living being. This is the meaning of the "distortion" which the physical world is said to undergo when it becomes a "biological world"; but a more accurate

³⁰ F. S. C. Northrop, Science and First Principles, p.175.

³¹ A. N. Whitehead, Science and the Modern World, p. 85.

way of stating it is to say that the physical world is a simplification of the biological. Thus Lewin says, for example, that though the homogeneity between organism and environment is a valid insight, "Der Mangel der Loeb'schen Tropismentheorie beruht im wesentlichen darauf, dass Ursache und Richtung der angesetzten Kräfte rein physikalisch bestimmt sind und nicht gemäss der psychobiologischen Umwelt, die für die verschiedenen Arten und Individuen in ihrem jeweiligen Zustande bestehen." ³²

The organism embraces the environment, and together they form a biological complex. The environment, so considered, is "biotic". ³³ The biotic environment or organismic world may be, in part, consciously appreciated, and as such it has been called the psychological world.

If we know only the internal physiology of a man or a higher animal we know but little of him; "How little he knows of England who only England knows!" Stern says,

Man kommt dem Wesen einer Person ⁵ also nicht nahe, wenn man nicht ihre Sinnbeziehung zu Gott und Welt, zu Gemeinschaft und Nebenmenschen, zu geistigen und materiellen Mächten erfasst; aber man wird ihr als Person erst dann gerecht, wenn man sie nicht in solchen Bedeutungen aufgehen lässt oder diese schematisch addiert, sondern die einzigartige Totalisierung und Individualisierung aller Einzelbedeutungen in der Sinnstruktur eben dieser Persönlichkeit erkennt. ³⁴

³² K. Lewin, "Der Richtungsbegriff in der Psychologie," Psychologische Forschung, 18, 1932, p. 261. Cf. also K. Köffka, Principles of Gestalt Psychology (N. Y., 1935), ch. 1.

³³ Cf. Hugh Miller, "The Relations of Physics and Biology to Epistemology," Jour. of Phil., 23, 1935, 628-640.

³⁴ W. Stern, Personalistik als Wissenschaft, 61.

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 ... (N. Y., 1935), Ch. 1.
 ... Miller, "The Relations of Physics and Biology
 ... 23, 1935, 633-640.

17. Synoptic method serves not merely in structural but also in systematic biology (though one depends upon the other, of course). In taxonomy both organismic and ecological methods are used.

Taxonomic schemes are of two types -- systematic and synoptic. Linnaeus, who distinguishes these two, says, "Synopsis tradit Divisiones arbitrarias, longiores aut breviores, plures aut pauciores; a Botanicis in genere non agnoscenda. Synopsis est dichotomia arbitraria, quae instar viae ad Botanicam ducit, Limites autem non determinat. Clavis classium synoptica est ex artis lege, ne confundatur distinguenda. (Est autem necessaria et tironi et magistro, ut facilius characteres inveniantur.) ... Ita ut praestet systema synopsi." ³⁵ By system Linnaeus means a set of inclusions, such as variety-species-genus, and it is based on some principle of division (in his botany, on the number of the sexual organs) which is simple and easy to apply. "The natural orders," by which he means the synoptic classifications, "teach us the nature of plants, the artificial orders teach us to recognize plants. The natural orders, without a key, do not constitute a method; the method ought to be available without a master." ³⁶

³⁵ Carl Linne, Philosophia Botanica, 1809 ed., sects. 154, 155. Cited in part by Merz.

³⁶ Linne, Genera Plantarum, 1764. Quoted in Merz, History of European Thought etc., II, 220-221. Cf. Ritter, "The Place of Description, Definition, and Classification in Philosophical Biology," Scientific Monthly, Nov., 1916.

Cuvier praised the des Jussieus for their contribution to botany, which was a classification based on the principle of "subordination of organs" (clearly an organismic principle). "... Ils ont les premiers remarqué avec soin, que tous les organes, tous les points de vue sous lesquels on peut les considérer, n'ont pas un égal degré d'importance, ni de permanence, que quelques-uns semblent, pour ainsi dire, dominer les autres; de sort qu'en établissant la classification d'abord sur ces organes prédominans, puis les divisions secondaires sur ceux qui ont un moindre degré d'intérêt, on est conduit à imiter le plus possible l'ordre de la nature dans celui de la classification." 37

The subordination of characters may be and generally has been morphological, but it may involve synopses of more complex objects than the organism itself. The more natural the taxonomy, the more ecological the synopsis. Within the organism in its environment, there may be a subordination of parts. A regard for these subordinations is, as a matter of fact, involved in actual research. A biologist who is studying a colonial organism first has

37 Cuvier, Rapport Historique sur les Progres des Sciences Naturelles, Paris, 1810. Quoted in Merz, History etc., ii, 283n. Cuvier claims for himself the analogous contribution to zoology. He opposes artificial classifications because organisms cannot be arranged in a linear fashion. The organismic principle was characteristic of his whole work: "Un être organisé est un tout unique, un ensemble de parties qui réagissent les unes sur les autres pour produire un effet commun. Nulle de ses parties ne peut donc être modifié essentiellement sans que toutes les autres ne s'en ressentent." -- Eloges Historiques, ii, 279. Cited in Merz, i, 130n.

to distinguish the anatomical limits of the colony; then to determine within the complex mass what are the relatively independent viable parts, and within these to study the subordination of organs.

The last two procedures go hand in hand, for in a colony in which labor is distributed, that which may be a whole in one sense is essentially a part in another. In these cases symbiosis must be recognized to be a fundamental feature of life, perhaps phylogenetically more basic than organic differentiation. ³⁸

18. In psychology as in physiology, synopsis is of great importance. In studies of the human being we find all the types of synopsis which have been mentioned, together with an emphasis which is not usual in other fields of knowledge on an intuitive grasp, an immediate synopsis, which precedes, accompanies, and develops along with other methods. It is needed only to point out that in the study of the richness and complexity of human personality, discursive description requires a synopsis, a pre-interpretative understanding. This is unavoidable, since our concepts are not adapted to expressing the ambivalent, fluid, ambiguous, pathematic, finely nuanced features of personality. Synoptic interpretation relates salient phenomena, which can be described, to the imbedded characteristics of the whole which defy

³⁸ Cf. J. S. Huxley, The Individual in the Animal Kingdom (Cambridge, 1912.). See also a statement of Koehler's that the isolated chimpanzee is not a true chimpanzee.

description; in characterology a pre-interpretative "healthy knowledge of man" is essential if descriptions are to be significant and meaningful. Stern says, "Das Ideal symptomatologischer Arbeit besteht in einem elastischen Wechselspielen zwischen intuitivem Verstehen und diskursivem Deuten." ³⁹ "The additive list [of character traits] must be transformed into an actual joint survey (Zusammenschau) and every item on the list into a personal component of this properly focussed total picture. Real understanding is not possible without an incessant shifting of view from the totality of character to the single feature and back to the totality." ⁴⁰

19. The method by which a complex whole is recognized in its more complex context has been called hypostatic by Stern (and he has, in conversation, called hypostatic method synoptic). He says, "Für jedes wissenschaftliches Einzelgebiet wird neben der Anwendung der alten Methoden der Analyse und Synthese, ja ihnen vorgeordnet, eine dritte zu fordern sein, die 'Hypostase', wie wir sie nennen werden.

³⁹ K. Stern, Personalistik als Wissenschaft, p. 71.

⁴⁰ K. Stern, "The Nature and Structure of Character," Character and Personality, iii, 1935, p. 474. This represents a change in some ways from the position Prof. Stern took in his Die differentielle Psychologie (1911) where he presented his "psychogeographical method". This was criticised by James Ward as being elementaristic. Cf. Psychological Principles, (2nd ed., Cambridge, 1920), p. 433.

Sie hat die Aufgabe, für die Phänomene des betreffenden Gebiets die ihnen zu Grunde liegenden 'rechten' Individuen korrekt abzugrenzen."⁴¹

It is the purpose of hypostatic method to distinguish within a context the "real individuals" and to apprehend them as united in a systematic unity. But as real individuals, the subordination of parts to a whole cannot be altogether continuous, for if it were there could be only one individual. Stern says later:

Diese Methode zerlegt nicht das Gegebene in seine Teile, wie die analytische Methode (denn die Person ist 'indivisibel'); sie verknüpft auch nicht ursprünglich Getrenntes wie die synthetische Methode (denn das Ganze ist früher als die Teile); sondern sie hypostasiert: unterlegt dem uneigentlichen Sein das eigentliche Sein. Dies bedeutet ein Doppeltes: die hypostatische Methode ordnet einer Vielheit von erfahrungsgegebenen Momenten die zugehörige Seinsganzheit zu; und sie holt umgekehrt aus der Ganzheit die Bedeutung alles zu ihr gehörigen Einzelnen heraus.⁴²

This last indicates the objections which synoptists have raised against elementarism. The synoptist is not opposed to analysis and synthesis, but only to the misplaced concreteness of views which take that which is simple as the sole condition of that which is complex, so that "organization" is a derivative, rather than a fundamental, fact for metaphysics and science. At any stage of scientific inquiry

⁴¹ W. Stern, Person und Sache, vol. 1 (2nd ed., Leipzig, 1923), p. 128.

⁴² Ibid., vol. III (1st ed., Leipzig, 1924), pp. 70-71.

both the simple unanalyzed elements and their superordinate wholes and organization must be admitted both by synoptists and by elementarists; the relative explanatory value attributed to them makes the distinction between the two views. This distinction is somewhat vague when the two views are held in their best and most productive, i.e. not most extreme and one-sided, forms.

D. Synopsis and the Organization of Knowledge

20. One of the chief characteristics of an intelligent effort to understand is that the mind is not satisfied by chance observations, but demands that its contents be incorporated into structures of explanation; and the more this is possible the more confident the observer is that his observation is accurate. In chapter I the integration of facts and fields of knowledge was spoken of as "regulative" synopsis, and now we turn to examine in some detail this aspect of knowledge.

A distinction has been drawn also between "regulative" and constitutive wholes in knowledge, the first (καθόλου) being a whole of knowledge and the second (εἰς τὸν) being a whole in knowledge. Heretofore our examination has been largely devoted to the latter, but it is significant that the English language does not verbally distinguish between

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The Organization of Knowledge

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intellectual constructions. Morris says, "A direct apprehension or intuition ever and above an apprehension of a concept of a subject might give us the kind of knowledge Kant calls synthetic, but as it is not always true (Kant admits) that we have made a connection, a proposition making such a report is better called synanctic, since there is an apprehension of togetherness but not a putting together." ¹

This word should be a useful new-comer to philosophical vocabulary, supplying the deficiencies of both synthesis and synopsis in the senses indicated.

The essential feature of synopsis in the sense in which it is applied to systems of knowledge and to the formal aspects of knowledge in general is not the intuitive moment ("-opsis") but the moment of complexity in unity ("syn-"). ²

21. In the same way that sensuous experience was seen not to have been made up from the aggregation of independent sensations, so it can be seen that thought is not originally concatenated from independent judgments, but is a whole or a complex of wholes which later differentiates into judgments and arguments. In primitive thought and in the thought of

¹ C.R. Morris, Idealistic Logic (London, 1933), p. 95n.

² It has already been indicated, and will be fully proved later, that synopsis of constitutive wholes cannot appeal to acquaintance in any unique sense; this is another justification for the use of the word synopsis here.

of the child there is a type of thinking which Stern has called "pre-categorical". He says,

Die Urbeziehung, welche gedacht wird, ist also gar nicht die Zweierbeziehung (wie sie Ursache und Wirkung, Mittel und Zweck, die zwei Glieder einer 'Aehnlichkeit' usw. verbindet), sondern eine Allbeziehung, eine Miteinander-zu-tun-haben von Jedem mit Jedem -- oder besser: ein noch gar nicht völlig Abgesondertsein des einzelnen Gegenstandes aus der unbestimmten Ganzheit der personalen Welt.

With the development of clear-cut conceptual thought, due to the necessity for making some contents precise and constant in reference, but integrating them together after they have been analyzed out of the original continuum, categorial thought appears. Mystical, intuitive, or aesthetical thought is that in which the pre-categorical total-relation is emphasised. The ambivalence of this thought and its imbeddedness in the feeling-continuum of personality give it an emotional character. Intuition in philosophizing is frankly of this nature, because the philosopher is explicit in his statements that philosophy must be a function of the whole

³ W. Stern, Allgemeine Psychologie, p. 403. Cf. Lotze, Metaphysic (Engl. transl., Oxford, 1887), vol. 1, pp. 18-19: "It was emphatically not as instances of a universal rule but as parts of a whole that men first conceived things: as related to each other not primarily by permanent laws but by the unchangeable purport of a plan, of which the realization required from the several elements not always and everywhere an identical procedure, but a changeable one. In this conviction originated the dazzling forms of the idealistic constructions of the universe." Cf. also Piaget, The Language and Thought of the Child, pp. 131 ff.

man, and that "dead intellectualism" is no more satisfactory than ecstatic emotionalism. Bradley, to whom metaphysics was a process of giving bad reasons for what we believe by instinct, says, for example, that the Absolute is a whole which "must be immediate, like feeling, but not, like feeling, immediate at a level below distinction and relation. The absolute is immediate as holding and transcending these differences."⁴ And Stern, again, says:

Die umfassendsten Denksysteme, die die Menschheit überhaupt produzierte, die der 'Weltanschauungen' im weitesten Sinne, sind deshalb Synthesen beider Denkweisen [categorical and precategorical]. Mythen, Religionen, künstlerische Weltbilder und -- auf wissenschaftlicher Stufe -- metaphysische Systeme sind aus den beiden Quellen des ganzheitlich-totalen und des abstrakt-kategorialen Beziehungsdenkens gespeist und reichen dadurch sowohl in den Wurzelboden der personalen Existenz wie in die Höhen der Spekulation hinein.

22. It has sometimes been said that philosophy is the attempt to interpret reality synoptically, and that the sciences, on the other hand, are necessarily abstract. This is true if "the whole of reality" is meant as the object of synopsis, and in this sense the sciences cannot be synoptic. There are, however, many formal features of the special sciences

⁴ F. H. Bradley, Appearance and Reality, p. 242. Cf. 159.

⁵ J. Stern, Allgemeine Psychologie, p. 405.

which deserve the name synoptic, and some empirical synoptic movements in science have already been discussed. Now it is proposed to show that synopsis is not a method peculiar to philosophical construction, but, in a somewhat more limited way to be sure, is true of all intelligent effort to understand. Philosophical synopsis differs from that in science in that it has a more complex object and makes fewer abstractions from it. In a preliminary way, the similarity between scientific and philosophical method is indicated in the statement that all intellectual endeavor aims, in its formal presentation, at logical consistency.

The examination will take the following form: first we shall investigate the general nature of systems and their construction, and then examine some features of the formal nature of the sciences.

23. One of Kant's most important services to logic was his demonstration that all synthetic judgments involve a superordination of principles. It is a prerequisite of synthetical judgment that terms be submitted to an intensional context whose principles are categories or rules for inference. Modern writers who reject the metaphysical aspects of Kant's theory still use this principle, though instead of referring to the rules as categories they call them "syntactical rules". Kant's error was that he sharply sundered analytic from synthetic

judgment; he did not see, or at least he did not emphasise, the fact that even an analytic judgment requires a set order of categories or syntactical rules which furnishes the nexus between any two terms or judgments, even in so-called immediate inference. Unless certain general principles defining a logical region are assumed, it is not true that A is either B or not B. This fact has been most clearly brought to attention in recent years by the construction of so-called artificial logics in which the syntactical rules are not isomorphous with those of Aristotelian logic.⁶ It is only because of this presence of general rules within a realm of discourse that one can be sure that analytical propositions will be consistent with the total body of propositions, and it becomes apparent, indeed, that no sharp dichotomy of judgments as analytic and synthetic can be made.

Every judgment in its legitimation involves a relatively wide system of meanings, rules of judgment, rules of evidence, etc. When a judgment is formed with the greatest rigor, Bosanquet is quite correct in maintaining that the choice involved between it and its opposite is a judgment that either this proposition is true or else the entire categorial scheme is false.⁷ We do not have facts -- brute, self-

⁶ Cf. C. I. Lewis, "Alternative Systems of Logic," The Monist, xlii, 481-507; O.L. Reiser, "Non-Aristotelian Logics," Ibid., xlv, 100-117.

⁷ Bernard Bosanquet, Implication and Linear Inference, p. 3.

existent data -- on the one hand by themselves and on the other a pure a priori categorial structure so that if there is a "conflict" we must choose between "fact" and "system"; rather, the fact is always a moment in a system of some kind (in the most primitive case, perhaps, a system of mere credulity, whose syntactical rule is : "Seeing is believing"), and if the "fact" is inconsistent with an already explicitly adopted system or realm of facts, there arises the necessity of a choice between systems and the discovery of a realm of discourse which will include both systems. This discovery is frequently made through an ad hoc alteration of the more comprehensive system. Take the case of a balloon rising in the air. The uneducated think that here is an "infraction" of the law of gravity which says that all bodies attract each other. The physicist did not abandon this law because two visible bodies did not attract each other so that the balloon approached the earth, nor did he deny the evidence of his senses. Rather, he investigated the system "balloon in air" and saw that this system as a whole is subject to the general principle of gravitation. Hallucinations and their correction are examples of a similar process; the item hallucinated is not denied as a "fact of experience", but the system of which it is a part is sublated in a larger whole of experience, and the inconsistencies which would appear in the whole are avoided by calling some of the

contents illusory.

Sometimes this is not possible, though, and an entirely new categorial scheme must be found. A famous case in which this was true was the over-throw of the entire classical physics through the Michelson-Morley experiment.

24. Science advances by lucky guesses or hypotheses.

In going beyond the immediate data with which he is dealing, the scientist is presupposing the reality of systematic connections beyond the range of facts in which he has already discovered them. This is the real meaning in Kant's transcendental method, it seems to me. Any judgment presupposes the sovereignty of a particular set of categories and a judgment (hypothesis) which extrapolates beyond a number of given facts to others which are not yet given does so quite obviously. The intuitive understanding, which was Kant's regulative ground for prediction, was a principle expressing the fundamental thesis of all rationalism: That which is thought in the most rigorous and comprehensive possible system of judgments must be thought to be actual in the realm of the total extension of possible experience.

A hypothesis, then, is a whole system applied to the making of predictions that can be tested, concerning supposed facts beyond the present bounds of the system. We do not finally judge or hypothesize that "a is b", but, as Bradley said,

"the world is such that a is b." In making hypotheses we are employing "constructive synopsis", going beyond the given to the whole which comprehends it and more.

The earliest ⁸ technical use of the word synoptic in English occurs in James Martineau's description of this aspect of scientific method; and in his statement, this foundation of science is seen to be quite like Kant's regulative principle. He says:

Intellectual and moral culture so affects the attitude of the human faculties towards nature, as to render the faith inevitable that all her parts constitute a perfect whole; and whatever may be the direction which culture predominantly takes - whether metaphysical as in Greece or physical as in modern Europe - the mind's instinctive demand for unity will make itself felt, and compel the universe to respond. What once was but an incipient point of clearness rising from the sea of the unknown, reflects ever more light from a surface gaining breadth and grandeur; no sooner does it open a habitable abode to settled thought, than subsidiary spots emerge around and group themselves invitingly to the explorer and ere long to the colonist; and as the island of knowledge is multiplied into the archipelago, so is the archipelago blended into the continent; till reason can every way pass to and fro over its world and find it a thing of spheriform perfection. Without this synoptic process, the occupation of the intellect would be gone; and the faith which attends it, - faith in the unity of nature, - while finding support from the contents of all sciences, is contingent on the special discoveries of none; and cannot be properly treated as the exclusive or characteristic revelation of natural philosophy. ⁹

⁸ According to The New English Dictionary.

⁹ James Martineau, "The Unity of Mind in Nature," (1852), Essays, Reviews, and Addresses (London, 1891), iii, p. 105.

That experience can be organized into a whole indicates that, on the rationalistic principle previously formulated, there is a metaphysical object which deserves the name whole, a universe. That there is seems to be indicated by the success with which science arranges its data in a posteriori systems and then uses these as a priori bases for the successful prediction and anticipation of experience. The two roles of the whole are aspects of one fundamental thesis given expression by Kant, namely, the object of knowledge in general is a whole, and to the extent that this formal whole is not evidenced, our knowledge is inadequate. By comparison with its own standard of perfection, a unitary, consistent, and comprehensive whole, the degree of integrity attained in knowledge is to be evaluated.

26. The purpose of Lachalier's famous Du Fondement de l'Induction was to examine the presuppositions of induction and hypothesis in general. He found it necessary to recognize a "horizontal" and a "vertical" order in nature. He says, "La conception des lois de la nature, à l'exception d'un petit nombre de lois élémentaires, semble donc fondée sur deux principes distincts: l'un en vertu duquel les phénomènes forment des séries, dans lesquelles l'existence ou précédent détermine celle du suivant, l'autre en vertu duquel ces séries forment à leur tour des systèmes, dans

lesquels l'idée du tout détermine l'existence des parties."¹⁰

The first is a statement of necessary connection in experience of sequences; the second affirms the stability of a whole such that similar conditions may recur among the parts. Recurring constellations of conditions are essential if the knowledge of sequences is to be a knowledge of regularities. Without these orderly groups of conditions, the stability of the whole, there would be no ground for regarding sequences as regularities, and then there would be no ground for asserting the uniformity of nature which is essential for induction; the large number of conditions which must concur in the production of an effect allows of such great variations in their combination that a serial elementarism, showing itself only in statements of (very low degrees of) probability would render induction virtually impossible.

Similarly, Cassirer writes,

The individual cannot be experienced save in connection with other spatial and temporal, near or remote elements; and this kind of connection presupposes a system of spatial and temporal positions, as well as a unitary whole of causal coordinations. The fact a is only accessible to us in a functional form as $f(a)$, $\phi(a)$, $\psi(a)$, in which f , ϕ , ψ , represent the different forms of spatial, temporal, and causal connection. The logical act of 'integration' which enters into every truly inductive judgment thus contains no paradox and no inner difficulty; the advance from

¹⁰ Jules Lachelier, Du Fondement de l'Induction (Paris, 1898), pp. 11-12. Cf. pages 78-79 for equation of the two orders with efficient and final causes.

the individual to the whole involved here, is possible because the reference to the whole is from the first not excluded but retained, and only needs to be brought separately into conceptual prominence. ¹¹

Efficient causality or any other linear connection supposed to hold between two independent entities must be regarded as an abstraction from a whole, a non-independent level in a hierarchy of conditions. The whole set of conditions is always presupposed, and to show its systematic relationships within its broader extension is the purpose of induction. This hierarchy may be regarded as an existential system, and in its formal symbolization, a system without qualification.

26. A system is a manifold of items seen under some one aspect or condition which defines its content or its order or both. It is possible to classify systems in two groups: abstractive and relational. ¹² We consider first the abstractive system.

If the aspect taken to define and to determine the contents of a manifold is some property of a plurality of items, every member of the manifold must, by definition, show this property. The system which results is an abstract univereal, a class and a concept of an abstraction. The particular items may

¹¹ Ernst Cassirer, Substance and Function (Chicago, 1923), pp. 243-249.

¹² This classification is adopted, with a few minor changes from H. Meyse, Der Begriff der Ganzheit und die Kantische Philosophie (Abnich, 1927).

participate in the idea in varying degrees, and by arranging the data in quantitative orders we have such abstractive systems as tables of population, of chemical weights, of stellar magnitudes, and the like.

In such a system, the existent items to which a universal refers are not taken in their entirety, and the process of forming such a system is not a synopsis of any single element. Such a systematization is a mode of comprehension, and it could be considered synoptic only in the sense that the various members of the manifold are seen in their togetherness as participants in a series or as manifestations of a single universal. ¹³ The immediate quality of the elements is lost in the process of abstraction; for example, in such a consideration of colors one does not see blueness or The Blue. The qualitative property of a single datum is replaced by a name or by an arithmetic constant which expresses its relation to other things which likewise participate. Thus the feeling of warmth of a body gives place to a number expressing a volume of mercury, and a number expressing a specific gravity is substituted for an immediate feeling of muscular strain. In every case, an immediate quality is replaced by a name or by a quantity and a name; and an item originally given may be

¹³ This is a synopsis only in the sense that things are seen "in their togetherness"; it is not a synopsis in the sense meant here, for the relation of a particular to a universal is not a part-whole relation.

classified and numbered in many different ways.

In the abstractive system the objects comprehended may be very different in all save one respect, but it is this one property which is of interest and which determines the context in which the object is considered. Any object, though, has a variety of properties and can, as a consequence, be considered in many contexts or perspectives.

§ 27. The second type of system is one whose principle of selection and order of members is not a common property of things but a type of relation among things or their properties. It is possible to divide relational systems, as these are called, into two sub-types, the former of which (material system) is concerned with relations between given terms having properties, and the latter of which (formal system) is concerned with relations whose terms are only pièces-à-terre for the relations.

The relational systems differ from the abstractive system in that the aim of the latter is to attach one predicate to a plurality of subjects, whereas the former seeks to attach many (homogeneous) relations to a single complex object. The former concerns itself primarily with intensions, the latter with extensions. The relational system regards relations as the constituents of the real content and as the structure of the objects, and the material system considers relations between things to be mere derivatives of existential

contingent properties of terms and not as of central importance. This is obviously the case where an abstraction is quantified, though the fact that a quantitative schema introduces an order in the manifold of items actually makes it quite arbitrary whether one considers these quantified class groups as examples of material or abstractive systems.

It has already been pointed out that an abstractive system is not a synopsis of an object. The single object can be known more nearly completely, however, when universals are seen as part-properties of it, that is, when many abstractions are made from it and related back to it. To be known fully, any object must be surveyed from ^{innumerable} many perspectives. An act of behavior, for example, can be understood only when it is seen from the perspectives of a psychologist, a physiologist, a moralist, and still others. The shift from one perspective to another requires a change of contexts and categories, for the physiologist (qua physiologist, of course) sees only physiological conditions and the psychologist, only the psychological. A method which integrates the views from many perspectives into a "full" view of an object may be called "perspectival synopsis"; the object in its larger complex is a part of a material system made up of many abstract universals related to each other. The single object in a complex system is a complex one, and this synopsis is the reverse process of

the simplification that the knowledge of the object has undergone in abstractions severally taken from it.

Perspectival integration, as the empirical application of a material system, is characteristic of our knowledge of many things we do not regard as objects of sensuous synopsis at all; in fact, it is characteristic of some methods which involve only the minimum of acquaintance. Gold is different for the economist, the chemist, and the connoisseur. These differences in meaning arise from the abstractness of these particular interests, and we can know gold adequately from these and other view points taken collectively. But as gold for the chemist has no properties which it has for the economist, how can one speak of these varying interests as being directed to one object, so that these perspectives thus engendered may be said to be perspectives of the same thing? The integration of abstractive systems or the focussing of perspectives is expressed discursively as a description, and it takes place by virtue of the fact that both the chemist and the economist can point to the same sensuous object and say that he is talking of that.

The full complexity of the object is never attained in integrating these perspectives, because in generalizing and conceptualizing, the immediacy is neglected and only what is common to more than one object falls to be considered. The uniqueness of the particular object pointed to is never given

discursively; an indication of individuality can never be given symbolically because no matter how many universals are taken and related in unique ways, they still define a class of entities which satisfy the conditions ^{they} stipulates. Abstractions only play around the object, and they converge towards it when a large number of them become integrated, but the object as this particular thing escapes being completely enclosed in a set of abstractions. ¹⁴ There remains what Heyse ¹⁵ has called the "hyletic kernel" which consists of those adjectives or terms not subjected to abstraction and not correlated with relations to other things. Thus in a system of taxonomy, which Heyse takes as an example of a material system, a number of abstractions can be integrated into a statement that an animal has features a, b, c, etc., but there is a "hyletic kernel" which is included in an empirical synopsis of a single animal but not in a material system of taxonomy --perhaps the color of the eyes, the length of whiskers, or even the size of an animal will be neglected because of their irrelevance to systematization. ¹⁶

¹⁴ Cf. Bergson, Introduction to Metaphysics, (N.Y., 1912), pp. 18, 27.

¹⁵ Heyse, op. cit., p. 13.

¹⁶ Here we have been concerned with abstractive systems and their integration into material systems as phases of a syngnosis of objects and collections. In chapter IV abstraction and synthesis will be studied more in detail in their own right.

28. In the formal system, the items are of interest only as they are meeting points of relations; but since all of the relations are not considered at any one time, some of the relations will appear as indigenous properties (adjectives) constituting, in their togetherness, supposititious things to which other relations are attached.

The distinguishing characteristics of formal systems are best seen in pure mathematics.¹⁷ One of the clearest examples of the purely relational nature of mathematical objects is given by Russell: "Numbers, in fact, must satisfy the formulae of arithmetic; any indubitable set of objects fulfilling this requirement may be called numbers."¹⁸

¹⁷ Many writers on the theory of systems neglect, it seems to me, the degree of empiricism involved in mathematical construction. We may leave aside the difficult questions concerning mathematics and sensuous experience; in pure mathematics, though, there is a process of Gedankenexperiment almost unequalled in difficulty. It is desirable to prove certain theorems for which some mathematical use has been found, and there begins a search for a set of axioms which make it and other theorems already known possible. Finally the axiom system takes the form about to be described, but to speak of a mathematical system merely as a formal system of relations defining terms is to pass over the real task of the mathematician, which may be thought of as the development of a system to comprehend particulars. The mathematician is like any other scientist, except that his data are particularly well adapted to his methods, being, in fact, facts.

¹⁸ B. Russell, Our Knowledge of the External World as a Field for Scientific Method in Philosophy (Chicago, 1918), p. 305. I must confess I do not understand Russell's statement on p. 188 that counting "has no meaning unless the members reached in counting have some significance independent of the process by which they are reached." Unless the significance is reached in some process of numeral definition, this seems plainly false; and numeral definition is another mathematical process.

Cassirer and Merz have very well illustrated the systematic nature of mathematical elements. Cassirer says that the essential character of all mathematical objects is "that no one of them means anything in itself alone, but that each individual is to be understood only in thoroughgoing connection with all the others." 19

19

E. Cassirer, Substance and Function, p. 172. Several illustrations may be given. Grassmann's Ausdehnungslehre is based on a "pure particular"; its only property is conceptual difference from others, and it has no particular specific content; it is different absolutely and without positive reference to what it differs from, but its uses define it, and it becomes a determinate something. (Ibid., 97-99.) In reference to the Dedekind cut, Cassirer says that though it originally presupposes some numbers, "Nonetheless, the process is finally reversed, for this production [of the cut by the numbers] comes to be the necessary and sufficient condition for our speaking of the existence of number at all. The element cannot be separated from the relational complex, for it means nothing aside from the complex, which it brings to expression, as it were, in contracted form." (Ibid., 61-62.)

Konrad Knopp uses a method of Intervallschachtelung for the determination of numbers, particularly clearly, for the determination of irrationals; in it, a number is determined by inclusion within a certain series of intervals determined in a certain way. Thus, "Wenn überhaupt eine Zahl ξ allen Intervallen einer Schachtelung angehört, so gibt es neben ihr keine zweite, sie ist vielmehr durch die Schachtelung eindeutig erfasst." "...Diese Schachtelung ... bestimmt den 'wahren', nur eben mit Hilfe der rationalen Zahlen nicht bezeichnbaren Wert von ξ [or any other irrational], sie spanne unzweideutig diese Zahl ein, also schliesslich: 'sie sei ein neugeschaffenes Zeichen für diese Zahl,' oder kurz: 'sie sei diese Zahl selbst.'" - Knopp, Theorie und Anwendung der unendlichen Reihen (2nd ed., Berlin, 1924), pp. 23, 24. The entire value of the method of nested intervals is lost if the last clause is not taken quite literally, for to suppose that the number is something in and for itself, not determined exclusively by this and similar processes is to render mathematical determination and definition of its data or facts

Synopsis is clearly involved in mathematical systems, both in their origination and interpretation. Lambert showed that a general mathematical principle is not an abstraction from less general cases, but is the comprehension of all of them. Thus, for example, an equation of the second order is not an expression merely of what is common to all conics, but with its parameters it is an exhaustive statement of what all of them are.²⁰ Wilhelm Burkamp writes: "Auch das streng ordnungstheoretische Denken bedarf einer Synopsis der Ganzheiten eines Ordnungsgebietes und mehr noch einer Synopsis der Axiomensystems, der Grundbegriffe, der deduktiven Zusammenhänge. Schon der Beweis der Widerspruchsfreiheit und der

impossible.

See Merz, History of European Thought etc., vol. 1, pp. 441 ff, vol. iv, p. 435 n., for discussions of intuition in mathematics (geometry) as a movement towards the vue d'ensemble. Steiner's theory of mathematical Gestalten is important in this regard, but more recent mathematics has been opposed to intuitionism and to any synopsis of a sensuous figure. Cassirer praises Hilbert's pure geometry as a "pure theory of relations" with no figures. (Op. cit., p. 94.) Synopsis is not necessarily sensuous, though, and in system construction the interplay between the parts and the wholes is a necessary psychological and logical fact.

²⁰ Cassirer, op. cit., pp. 19-20. Cf. also p. 226: "Only of 'presentations' can it be said that the more general they become the more they lose their intuitional sharpness and clarity, until they are finally reduced to mere schemas without significance for reality. Judgments, on the contrary, determine the individual the more exactly the wider the sphere of comparison and correlation to which they relate it. Increase of extension is here parallel with determination of content."

Unabhängigkeit bedarf einer Umfassung des Ganzen, die ohne Synopsis nicht gut durchzuführen ist." 21

Applied mathematics is the most abstract of all empirical studies, yet pure mathematics is, in a certain sense, more concrete than other sciences, if it deserves to be called a science at all. Mathematics when applied refers only to the most abstract and universal properties of objects (quantity and formal structure), though its structure may be concrete. Pure mathematics does not even pay attention to these empirical properties; intoxicated with its own autonomy, it builds worlds of its own. A science is advanced, says Kant, according to the amount of mathematics it involves. If today we should agree with him it would be because of our knowledge that science, in supplementing its partial abstractions, must become formally like mathematics, since system, with a wide comprehension of details, is a goal of science; this is more nearly universally characteristic of the sciences than their search for quantitative relations, for which they often do not have the proper and sufficient formal conceptual structure necessary for significant interpretation. Perhaps this is the case with sociology and psychology. 22

21 W. Burkamp, Die Struktur der Ganzheiten, p. 350. Cf. S. MacLane, "Analysis of Mathematical Structure," The Monist, 40, 1935, pp. 118-130. Cf. also H. Poincare, The Foundations of Science (N.Y., 1929) on the impossibility of defining unity.

22 For what is called the "analytic ideal" (systematic ideal) of science, in which all propositions are treated as analytical, see C. I. Lewis, Mind and The World Order (N.Y., 1929)

29. In chapter I it was pointed out that the single fields of science are not content to remain within their natural limits, but strive to extend their provinces far beyond the regions in which actual research is performed by the science in question. The limitation of a science within the field of knowledge in general is due to the particular means which must be adopted to solve particular problems; a science is defined by its problems, not by its subject matter. Gross anatomy and portraiture both concern the human body, but with different purposes and problems.

Scientific methods and concepts are often applied far beyond the field in which they had their original application and meaning. The extension of methods parallel to the extension of application of concepts insures some (operational) meaning for the extended concept; and if methods cannot be adapted to the new sphere of application of the concept, the concept may become scientifically meaningless. But if, on the other hand, the particular method corresponding to a single concept is exclusively employed beyond the previous apparent limits of the science, the concept gains no new connotation by being extended, and the complexity of the sphere of its new application is neglected.

If the concepts and methods of one science claim universal application in the world of objects, this claim is called "scientific imperialism". If the problems of one science are

said to be amenable only to description within the categorical scheme of the problem itself (e.g., social problems in terms of sociology), but to explanation within the field of some other science (e.g. social psychology), the claim is "scientific reductionism". Perhaps the most prominent type of imperialism is physicalism, which claims that physics has the last word to say on any problem. Since all bodies have physical properties, it is supposed that the methods of physics are applicable to them, whether they are objects of ordinary physical investigation or not; if the claim is made that the physical descriptions and their homogeneous future developments are the only fundamental and valid account which can be given, physicalistic imperialism appears. It is assumed that the axioms of physics are absolutely fundamental principles of reality; and that chemistry and other sciences are dealing with problems that physics "just hasn't had time to get around to." But when the physicist does get around to a problem, it is said that all other attacks on it are not parsimonious, for explanation has been reduced to physics. This universal extension attributed to some concepts is always syncretical in aim even if the results are often too poor to make it so in effect. Physicalism and all imperialistic attempts purpose to see the world as one existential system homogeneous in all its parts, because they are conceived under homogeneous cat-

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egories; the formal structure of an imperialistic science is supposed to approach a formal relational system. Comte almost seems to identify synopsis with this homogeneity of categories, for he says, "Never since this period [the theological] did the esprit d'ensemble manifest itself to the same extent; and it can never be realized except by the direct construction of the positive philosophy. The primary cause of this absolute systematization doubtless lay in the homogeneity of human conceptions, then uniformly theological." ²³

The most important philosophical movement in the imperialistic direction at the present time is neo-positivism, having much in common with Comtism. Ernest Nagel says, "The fundamental thesis of neo-positivism is that all the sciences form a unity, since propositions in any science can always be translated into the universal language of physics." ²⁴ The universal language of physics must be understood quite literally; the theory of operations is beyond the scope of discussion here, but the point must be emphasized that the neo-positivists are assuming the possibility of isomorphic methods applicable to all subject matters.

The broadening of a field of investigation is undoubtedly a sign of scientific progress; for example, the extension of the concepts of physiology may have caused the disappearance of the

²³ A. Comte, A System of Positive Polity (Engl. transl., London, 1854), vol. iv, p. 307. Quoted from the Considerations Philosophiques ... of 1845.

²⁴ E. Nagel, "Impressions and Appraisals of the Analytic

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pseudo-science of phrenology. But what justification is there for the claim of any science to reduce the problems of another science to its own? Let it be granted that every body in the world has physical properties and thus can be a proper subject matter for physics. Still it cannot be shown that bodies are only physical. Ritter writes, for example, that elementarists say an organic process is "transferred" from zoology into the field of chemistry when a chemical cause has been found for it; but he answers, "Nothing can any more take the study of animal phenomena away from zoology and put it into chemistry than it can take bread-making away from the baker's art and put it into chemistry and physics. ... What analysis actually does in these cases is to extend the bounds of physico-chemical forces and laws into zoology, morphology, etc., and to prove that if zoological, morphological, and physiological undertakings are to move into ever greater fullness, aid from physics and chemistry is indispensable." ²⁵ And against the claim of a physicist who reduces the fall of a cat to the laws of physics, and "thinks that he has done something," A. Meyer writes,

Philosophy in Europe." Journal of Philosophy, 31, 1938, p. 587.

²⁵ W. E. Ritter, The Unity of the Organism, vol. ii, p. 209.

Wollte man aber behaupten, dass eben die in Frage kommende Kombination beider physikalischen Gesetze die gesuchte physikalische 'Ableitung' darstelle, dann muss ich einem solchen Verfahren allerdings vorwerfen, eine petitio principii zu begehen. Denn das ist ja keine 'Ableitung' mehr, sondern eine glatte mathematische Beschreibung eines rein biologischen Sachverhalts, gegen die auch vom vitalistischen Standpunkt nicht das geringste einzuwenden wäre; ist sie doch vollkommen vereinbar mit dem Postulat einer Autonomie der biologischen Forschung gegenüber der physikalischen. 26

In any metaphysics or science, though, there is undoubtedly a process of taking a concept which has a fairly definite meaning and extending this meaning to cover facts previously considered under other categories. The concept acquires a new meaning in its various applications, and the wider use of the name of a concept taken from some single science often leads to confusion. Here it is seen again that the so-called law of inverse variation of extension and intension does not hold; the greater the field of denotation of a concept, at least sometimes the greater its connotation also. This is the normal course of the development of categories, which take on, in addition to their specific meaning, and "analogical" meaning, rich in suggestions but laden with ambiguities. "It is indeed the property of each metaphysical system to widen a category of thought far beyond its original meaning and to make it into one which comprehends the whole world." 27

26 A. Meyer, "Die Idee des Holismus," Scientia, 58, p. 22.

27 W. Stern, "The Metaphysical Foundations of Critical Personalism," The Personalist, 17, 1936, p. 245.

Scientific imperialism is an idol or an ideal for scientific progress, and it is right that all scientific workers should try to broaden the application of their concepts, but it cannot be claimed except in a few cases that a problem in one context is merely a problem in another. If the formal structure and categories of a particular science are attributable to all the sciences, the ideal of Sinnetzwissenschaft is attainable; there is no a priori reason to suppose this ideal to be beyond the reach of science, but a decision here rests upon the future progress of the various sciences in the direction of "reduction." It must be admitted that at present the various sciences are working with levels of postulates not yet reduced to one set or even ideally isomorphic. The danger in reductionism at the present time is that the description of the more complex of objects of the sciences will suffer if merely the methods and categories applicable to other levels are applied to them. 28

29. If the formal structure of one science is not simply translatable into that of another, and if the sciences are to form any kind of integral whole, the integration must come

28 This was the case, for example, with behaviorism, which was physiological reductionism.

from the object. Previously perspectival synopsis has been discussed; now it can be seen that, as imperialism, a formal system of sciences, is not yet attained, there might still be a material system of sciences. Whatever unity the sciences have in this system will come from the contents, the objects of the various sciences. Now it is necessary to consider the structure of the perspectives of objects.

There are systems of very general types of categories and judgments, such as a logical system, which underly more special realms of discourse. For example, the principle of sufficient reason is strictly an Urkategorie or a "pre-regional principle" ⁴⁹ which may be specified in various regions such as logic (ground), physics (functional condition or cause), and biology (stimulus and situation). These stipulations of the pre-regional principles or primitive categories may be called "parameters", and through them there is some continuity in the construction of conceptions in the various sciences.

Besides these parameters, as grounds of abstractive or formal unity, the sciences are also integrated in that they are perspectives of the same things. Thus several parameters may refer to the same (same in naive acquaintance) object;

⁴⁹ Hans Reiche, op. cit., distinguishes reine Kategorie from Gebietskategorien in his regionale Logik.

physiology and psychology are related in being studies of different perspectives of the same thing, and insights in one science give suggestions in the other. For a concrete example, Woodworth tells us,

A chimpanzee, let us say, joins together two sticks of bamboo and uses the jointed tool for reaching a banana. This is a psychological description; much more and finer detail might be added and the description still remain at the psychological level. Now the physiologist may undertake to describe this same series of events, in terms of the action of different muscles, of separate muscle fibers, synapses in localized nerve centers, and so on. He would be describing the same process -- not a 'parallel' process -- but his description would employ different concepts and would, in general, be very different from the psychologist's description. It would be much more minute than the psychologist's description, but not necessarily any truer. It would not include the relationships observed by the psychologist, and would not be so useful for purposes of prediction and control, if we wished to know what the chimpanzee would do in a given situation.

Woodworth here raises some real problems when he speaks of the same process in various perspectives and the relation of the truth of one description to that of another; and Cassirer is quite right in saying that in order to advance from abstract types to a representation of a real process,

30 R. S. Woodworth, "Dynamic Psychology," Psychologies of 1935, (Worcester, 1935), p. 130.

"A thorough mediation is needed, so that all these different fields again become members of an inclusive system." ³¹

Systems may be arranged in two orders: vertically and horizontally. The vertical arrangement may be illustrated by reference to the works of the late J. S. Haldane, in which he held that the physical and the physiological worlds were existentially the same, but that the physical and the physiological pictures of the common world abstract from it to a different degree, so that the physiological picture is more adequate or "higher" than the physical. ³² Heyse has expressed the correlation of regions as a function of "depth" (Tiefenabstufung) so that one system may be a moment sublated in a higher, as geography in history. ³³

One science can be said to be more adequate than another in the sense in which Woodworth and Haldane indicate. In addition to the comprehensiveness of a system (a criterion generally difficult or impossible to apply), there is the pragmatic element of satisfaction of needs of knowledge of certain types; the first is Haldane's, the second Woodworth's emphasis.

³¹ E. Cassirer, op. cit., p. 190.

³² Cf. Haldane, The Philosophy of a Biologist (Oxford, 1935) pp. 64-65.

³³ Hans Heyse, op. cit., p. 37.

without regard for this pragmatic element, and if the criterion of comprehensiveness cannot be applied (or if there is no difference in the comprehensiveness of the various systems), the sciences appear to be arranged "horizontally". Thus, abstractly, we cannot tell whether economics or chemistry is a more adequate study of gold; it is a question whether the word "adequacy" even has a meaning here. In any concrete situation, though, this horizontal arrangement is changed into a vertical one by virtue of the actual interests which initiate the investigation. Only if one explanation includes another can it be said that one is absolutely more adequate than another; and it is just this which is claimed by imperialism and reductionism. 34

31. The highest form of organization of knowledge is in a philosophical world system, if the criterion is comprehensiveness of a wide range of facts. Philosophy, according to Spencer, is completely unified knowledge; but philosophy

34 H. A. Myers, The Timely and the Synoptic Elements of Metaphysics, Dissert., Cornell, 1932, has dealt with the arrangement of perspectives as the synoptic element of metaphysics, while the contents of the various perspectives which may vary according to the historical period, are called the timely elements. He substitutes the synopsis of perspectives for the doctrine of a scale of perfection of types of knowledge. (This work is not available to the public; I am indebted to Dr. Myers for an abstract of it.)

is much more than this, for it has reference beyond what is known to what is epistemologically said to be the ground and completion of that knowledge which is established in the sciences and the special branches of philosophy. 35

CHAPTER III

THE PREMISSES OF SYNOPSIS

tion of the problems of synopsis is limited, so far as possible, to psychological and

In the final chapter, a detailed study of the role of synopsis in philosophy will be given. Cf. also above, pp. 16-18.

epistemological character of the subject and object in the synopsis knowledge situation.

In the preceding chapter synopsis has been defined and several varieties distinguished: immediate synopsis, mediate synopsis, constructive synopsis, and perspectival synopsis. A dual meaning of the word whole was pointed out, and by reference to these two meanings synopsis was classified most generally as constitutive or regulative. A double role of objects as both parts and wholes has been discussed, and it was argued that every act of synopsis is a knowledge of an object as a part or as a whole or as both. In such an act is not a simple awareness of an undifferentiated object, but involves in its very nature an acknowledgment of diversity

CHAPTER III

THE PRESUPPOSITIONS OF SYNOPSIS

1. Heretofore the discussion of the problems of synopsis has been limited, so far as possible, to psychological and methodological questions. It is necessary now to turn to the metaphysical character of the subject and object in the synoptic knowledge situation.

In the preceding chapter synopsis has been defined and several varieties distinguished: immediate synopsis, mediate synopsis, constructive synopsis, and perspectival synopsis. A dual meaning of the word whole was pointed out, and by reference to these two meanings synopses were classified most generally as constitutive or regulative. A double role of some objects as both parts and wholes has been discussed, and it was argued that every act of synopsis is a knowledge of an object as a part or as a whole or as both. As such an act is not a simple awareness of an undifferentiated object, it involves in its very nature an acknowledgment of diversity

in unity.

Previously questions concerning the metaphysical object have had to be dealt with because, within the field of knowledge, the essential characteristics of the objects cannot be sharply separated from the essential characteristics of knowledge of it. Any description of the act passes necessarily to a characterization of the object, and so an attempt to differentiate synopsis from other acts involves a distinguishing of the "synoptic object" from others.

In this chapter, the general problems concerned in the nature of the part-whole relation will be discussed first. Then the individuality of the subject and the wholeness of the object as known will be investigated; and finally the problem of the relation of acquaintance to synopsis will be considered in greater detail than was possible in the preceding chapter.

A. General Theory of Wholes and Parts

2. To begin with, some important concepts must be made clear, though some of them perhaps cannot be defined.

By a whole in the most general sense is meant a manifold of entities considered not in their plurality and disconnectedness qua many, but as a single complex object, group, or meaning of a singular noun. This corresponds to the Greek *ὅλον*, and is the only sense in which the word whole will be

...ly, the essential characteristics of the objects cannot be separated from the essential characteristics of the objects of it. Any designation of the object necessarily involves a determination of the object, and so an attempt to distinguish the object from other objects involves a distinguishing of the object from others.

In this chapter, the general problems concerned in the study of the part-whole relation will be discussed first. The individuality of the subject and the wholeness of the object will be investigated; and finally, the relation of resemblance to synopses will be discussed in greater detail than was possible in the previous chapter.

1. General Theory of Wholes and Parts

To begin with, some important concepts must be defined. Some of these perhaps cannot be defined.

In the most general sense, a whole is a unity.

used in this chapter. Where is intended, the word system or concrete universal will be used.

A part is an entity in a manifold considered in relation to it as a whole, of which it is said to be a part. Whole and part are used in a mutually implicative sense. Whole implicates the having of parts, and part implicates a whole to which it belongs. ¹

An element is an entity considered not in relation to some whole of which it may be a part, or some entity that is not actually a part of a whole.

An element which is not a whole is an atom or a simplex.

The world is full of a number of things, and whether it has anything more than a grammatical unity is irrelevant at the moment. It consists of many things which are, at least nominally, its parts. It is necessary to inquire, in what senses, if any, these things are not merely parts of the world but are themselves wholes. This is necessary according to the conception of synopsis defended here, because the synoptist believes that to understand an object it is necessary to go upwards to superordinate wholes (if there are such) and downwards to included parts (if there are such).

¹ Bertrand Russell, The Principles of Mathematics (Cambridge, 1903), vol. 1, p. 137.

3. The most universal type of whole is a sum. Any two elements can, through being related by the conjunction "and", be regarded as parts of a whole. The manifold of terms and conjunctions is integrated or summed into a single complex thing which is a whole; and in some cases a singular verb may apply to it. The sum as a type of whole is peculiar in that it is logically and grammatically singular, while existentially the plurality of elements is unaffected. The elements, a priori, are existentially equivalent to parts. In other words, a sum is, as plural, an ens reale, but as a whole, i.e. as singular, it is merely an ens rationis.

A sum consists of parts, but itself may be a part. What is distinctive about the part-whole duality of the sum, however, is that in the same existential context a sum can be both a part and a whole. Previously it has been seen how this is possible in wholes such as a machine/considered only mechanically. It was pointed out in the previous discussion that an individual whole must have some relations between itself and other things which do not obtain among its parts. In sums, whose parts are/connected only by and, there is no inhomogeneity between "part and part" and "sum and sum"; the pervasiveness of the relation of conjunction prevents the sum from having anything objective in its nature as an individual whole. The only principle of individuality which might apply to sums, which is a case of inhomogeneity between intra-

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and extra-relations, lies in the assertion by a subject of "just this much and no more"; thus the sum as a whole is an ens rationis.

4. There are not, however, any finite physical sums as wholes. Everything in the world is related to every other thing by the relation and, and in distinguishing one existent whole from another we need to find some relations among elements which do not obtain among all elements. The elements having these relations will be parts of a whole, and this whole will be existentially distinct from its context.

The physical object most nearly approaching the sum in simplicity is the aggregate, which is a whole of parts selected on any grounds whatsoever, and having a certain order as a result of this ground. Most often, the ground is space and the order is one of contiguity in space.² If we have four grains of sand, a,b,c,d, their sum is $a+b+c+d$ or $b+d+c+a$, or any other "arrangement"; but to call them a sum is to abstract from their real collective wholeness, for they are

² The relation taken as the ground of selection might be one of similarity, difference, or identity. In these cases, there would be some relation other than and so that we should not be dealing with a mere sum, though perhaps the whole would be an ens rationis in some cases. Yet it is not properly an aggregate, for there is no order resulting from the ground of the selection. Perhaps a class is a logical whole which is still another type, irreducible to any other. In aggregates the relations are considered to be empirically given with the parts.

really an aggregate which has some (spatial) order so that a.b.c.d. is not the same as b.c.d.a, for in any relation such as location the order of the terms is important. And expresses no order at all, even if there is order in the objects to which it refers.

It should be observed that the first type of whole may be regarded as an abstraction from the second. Every aggregate or any other kind of whole is a sum, but not all sums are examples of other types of wholeness.

5. The mode of attributing to sums (and to some aggregates) a unitary nature is instrumental. A thing is called a whole, many things are united under a single name applicable to a group, on account of the use which can be made of it as a whole, or because of the appearance of the collection as one thing. Because our modes of perception have evolved to fit us better to our environment, it is not unreasonable to suppose that the two grounds are originally one. Universally our recognition of sums, and generally of aggregates, is due to the pragmatic interest we take in some complexes. All objects are related by and, and perhaps all of them are related in some other ways, too, so that they can be referred to as a whole. But what plurality of entities is asserted to be an aggregate is not determined only by what is an aggregate per se.

The pragmatic determination of wholes plays a role also

where there is a metaphysical character of individuality due to an inhomogeneity between intrinsic and extrinsic relations. Thus aggregates, as metaphysical wholes, are chosen for considerations on some grounds other than their metaphysical nature.

The choice of some aggregates from the total aggregate of the world is based on a choice of principles which are expressions of the fact that we can deal with some things severally and collectively in various contexts at different times. M. A. Copeland, writing on the part-whole relation in its reference to the principle of identity, says, "What is identical for one purpose may for other purposes need to be differentiated. The question as to whether the whole is to be identical with its parts, or with its parts in some specified set of relations to each other, becomes a question as to the purposes for which this identity is to be asserted."³

6. In chapter II a general principle of individuality was formulated. Here it can be applied to determine the difference between a sum which is more than, or other than merely, a sum. If an element can be both a whole and a part in one context (i.e. under one category, such as quantity), its wholeness is to be grounded in some other context; if the element has this dual role in every category except that

³ M. A. Copeland, "Instrumental View of Whole-Part Relation," Jour. of Philos., 24, 1927, p. 97.

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in which it is asserted to be a whole (i.e. the category of meaning for the subject), its wholeness is an ens rationis. Individual wholes as objective have the property of being wholes and parts in different objective contexts. ⁴

To illustrate, in ten pounds of sand I may attend to two pounds and call them "this amount". But "this amount" is imbedded in a context which does not respect the individuality I have attributed to it. I can go beyond these two pounds (plural, now) and speak of three pounds as "that amount", of which "this amount" is a part. But I am still speaking of

⁴ Some limitation on this thesis must be made. (1) If the sum is the totality of all elements in the universe, or say all possible logical terms, it may be that we are dealing with a sum incapable of being "imbedded" in the same context which it furnishes to its parts. This is one exception whether "all existing elements" and "all logical terms" are parts of any type of whole other than aggregates and sums or not. (2) In other cases, such as "all x's in the universe", it is obvious that there is some relation (e.g. similarity or identity) other than mere conjunction between the parts. Besides that, there is at least a formal reference to the denial of the possibility of there being cases of x not included in this whole, and this denial may constitute a particular type of inhomogeneity. Cf. above, p. 129 n.

Previously I have indicated the use of this principle in logic and in cosmology. It seems to me to be a fundamental principle for distinguishing universals (concrete) and individuals in experience. Since formulating this principle of "a shift in categories", I have come across Whitehead's use of the principle of "all or none" as a criterion for individuation, and I believe it has much in common with this principle, and also the metaphysical definition of individuality which will be given later. Cf. Symbolism. Its Meaning and Effect, (New York, 1927) p. 28.

the same sand pile and still speaking in terms of one category, namely, quantity. Since all things in the world are amenable to subsumption under this category, it follows that every whole must have some summative properties.

To illustrate the discontinuous nature of the whole-part duality when the whole is an objective individual, one need only refer to the human being to see that the principle of individuality is not in the category of meaning alone, and hence the wholeness of a human being is not supposititious. Although it may be true that the environment is as closely related to the organism as the whole organism is to its parts, yet it is not true to say of all the relations that they are of a homogeneous context (as perhaps mechanists do). The anatomist begins his study with the skin and goes inward with one set of concepts and methods; the ecologist begins with the skin and goes outward with another. The body is a whole anatomically, but ecologically it is a part. Until ecology and anatomy can be shown to be isomorphic, i.e. reducible one to another, these relationships must be regarded as heterogeneous and the body as a real whole .

7. The relation of a thing to its medium must be discussed in connection with the problem of wholes which are not continuous with their surroundings. If the parts are organized in a way which does not appreciably affect the whole of which it might be regarded as a part, and if this whole is so per-

vasive in its influence upon all its parts that its effects are not discovered by differential studies within the context of the parts of the manifold, then the relation is more properly speaking not one of parts to whole but of mere inclusion in ⁵ or of thing to medium. ⁶ The relation of part to element is not a sharp distinction, for everything is in some medium, and medium cannot be sharply differentiated from whole. In any case it is necessary to determine empirically whether a situation is a medium for a thing or a whole of which it is a part. ⁷

To illustrate this relation, consider the organization of human society and the solar system. The various forms of human society have no effect on the solar system, and the organization of the solar system exerts identical influences on all forms of society and all members of the mundane manifold which includes societies. Since its effects on these entities

⁵ Kurt Lewin, "Gesetz und Experiment in der Psychologie," Symposion, Heft 5, 1927, p. 413.

⁶ Fritz Heider, "Ding und Medium," Symposion, Heft 7, 1927,

⁷ Heider seems to me to go too far in some of the distinctions he draws. For example, the medium in a perceptive situation is the "Aufgezwungene", without continuity or unity, lacking internal self-dependence, and receiving its meaning only through reference to the "Einzelvorgänge" of a thing. (P. 120) The inter-dependence of a complex thing (pp. 123-124, 135, etc.) does not seem to me to be determinate enough to make any sharp distinction valid.

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is not differential but pervasive, for the processes of knowledge it is looked upon as merely one of the permanent conditions. Although logically and metaphysically I am a part of the solar system, that is, a thing which goes around the sun, it is methodologically more reasonable to say that I am in the solar system. Similarly, electrons are in me but not parts of me; my organs, whose structure determines my whole being and whose structures are affected by me as a whole, are not merely in me but are parts of me.

8. When we leave the level of aggregates whose unitariness expresses not simplicity but oneness as an object of knowledge, we come to over-summative wholes which are not homogeneous inwardly and outwardly.

It is true that every whole has summative properties; chemical compounds with emergent properties have weights which are resultants. It is here that "appearance" has its real place as an indicator of integrity. We can regard a square in a confused mass of lines only as a whole and not primarily as an aggregate of four lines with no innate unity. It has an unambiguous wholeness in itself, and a similarly clear relation of being in (not a part of) its field. We are not justified, however, in moving from this appearance of wholeness to the assertion that the object in itself, whatever that may mean for us, has emergent properties as a whole, and that its appearance means it is a whole; it may

be justifiable, but it is at least a debatable question. If the object is exhausted geometrically, i.e. it is only a figure, then the particular gestalt-quality is, as the school of Gestaltqualität held, attributed to it by the mind; its unity depends upon its exciting a dynamically integrated process of perception which is not aroused by four lines placed at random. It seems obvious that four lines forming a square constitute a different type of gestalt from the one which four bar magnets form when placed at random but with freedom to move. Four lines arranged in a square look like a whole but physically they are not capable of arranging themselves in this form or resisting change in the same way that four bar magnets are. Can we say that the unity of the four lines in a whole is merely subjective in a sense which "dynamical" complexes are not? Is the ground of unity in one case the subject, and in the other the object? If there is this difference in the two cases, there are two questions which must be answered:

(1) In what sense does the subject give unity to its presentations?

(2) Granting that not all wholes are entia rationes, what is the ground for claiming for some wholes, but not all, an objective nature which is metaphysically significant, i.e. not due to our ignorance or methods, and likely to disappear with the advance of knowledge?

The two following sections will be devoted to these questions.

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swered:

- I. In what sense is the unity of the four lines in a square a whole?
- II. In what sense is the unity of the four lines in a square a dynamical constitution?
- III. In what sense is the unity of the four lines in a square a subjective unity?
- IV. In what sense is the unity of the four lines in a square an objective unity?
- V. In what sense is the unity of the four lines in a square a unity of the mind?
- VI. In what sense is the unity of the four lines in a square a unity of the world?

answered.

B. The Wholeness of the Subject

8. The psychological act of synopsis is a complex process with differentiations within it, yet it is not disrupted into a plurality by its internal complexity and multiplicity. As taking place within a psychological present, it may extend beyond the temporal threshold of sensitivity, but because of its reference to a single complex object it will still be one act. Now if the act of synopsis has as its object a sum or an aggregate, both of which, as distinguished from an environment or a context, are entia rationes, there must be some integration by the subject which constitutes it a whole even in this sense.

If, furthermore, the object is supposed in itself to be a complex one, whose wholeness is real, then the subject's individuality as the ground of integration of the successive stages in the cognition of the object is still a necessary condition for the cognition of the object as a whole. In the latter case, however, this is not the sufficient condition for the object's being given in knowledge in its true nature as a real whole. In a word, the continuity and wholeness of an object in knowledge presupposes sometimes a kind of wholeness in the object itself, but always at least the wholeness and continuity of the subject that knows.

Let us see how this is so. The organization of a stream of

of experiences into wholes and parts presupposes a unifying and segregating subject as a necessary condition, or at least as a phenomenon to which phenomenal differentiations are given; but as the subject is always present, yet does not invariably unify contents into wholes, some grounds of unity and of separation must be sought elsewhere than in the mere presence of the subject as an epistemologic agent.¹

10. The denial of any valid ground of organization of experience, and the pragmatic acceptance of the organizations within it as mere "matters of fact" is the essence of the Humean phenomenalism. If experience is orderly, though, there must be some continuity in it, and for this some principle not given along with the other contents, as one thing among many things, is necessary; for an element just given along with the others must remain externally related to them, unable to reduce them to a unity or a continuity. Hume wrote, "All my hopes vanish when I come to explain the principles that unite our successive perceptions in our thought and consciousness. ... Did our perceptions either inhere in something simple or individual, or did the mind perceive some real connection among them, there would be no difficulty in the case."² Mill, in his criticism of Hamilton, has shown the difficulty in all such views: "If, therefore, we speak of the mind as a series

¹ One of these conditions of course may be the subject as psychologically active.

² Treatise of Human Nature (Everyman's ed.), II, 317.

It is not possible to have a subject as a necessary condition, or as a condition of the subject, or as the subject to always present, yet does not

of any valid ground of organization of the organization and the organization itself is the essence of the organization. It is not possible to have a subject as a necessary condition, or as a condition of the subject, or as the subject to always present, yet does not

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of feelings, we are obliged to complete the statement by calling it a series of feelings which is aware of itself as past and future; and we are reduced to the alternative of believing that the mind, or the Ego, is something different from any series of feelings, or of possibilities of them, or of accepting the paradox, that something which ex hypothesi is but a series of feelings can be aware of itself as a series." ³

Radical empiricists and empirio-criticists have accepted the paradox, embraced the "final inexplicability", and asserted that it is of the nature of experience to be integrated as it is. Two non-positivistic attempts to answer the questions raised may be mentioned.

(1) The soul or the person is the transcendent condition of the activity which relates successive experiences. The organization so produced is found within self-consciousness. These theories take Hume's first alternative and hold that "our perceptions ... inhere in something simple or individual."

(2) Some other philosophers take experience as the metaphysical prius, but hold that the second alternative, there is some real connection perceived, should not be excluded.

³ J. S. Mill, Examination of Sir W. Hamilton's Philosophy, pp. 260-262. This and the quotation from Hume are taken from Brightman, Introduction to Philosophy.

Rather, experience is taken as the fundamental metaphysical category, and self-consciousness is supposed to be working out its own organic and architectonic structure. This is Hegel's answer to the question, and though it is not fully accepted by many philosophers, it has been influential in forming conceptions of individuality in recent times. All theories of individuality which have been deeply influenced by Hegel's philosophy say (i) that it is of the fundamental nature of experience, and hence of the world which is in experience, to be organized; and (ii) that this organization is no mystery when approached properly. It was mysterious to Hume because he started out with an abstract and artificial isolation of independent items, and he was never able to work back to real, living experience.

Thus synopsis is not something that mysteriously supervenes upon discreteness, but is itself the fundament and material for whatever abstraction and isolation is actually or ideally performed. To this view, both those who give the first answer and those who give the second would agree.

11. Original synopsis is the basis of all experience, whether of individual consciousness or any otherwise conceived. J. T. Merz wrote,

The totality or 'together' of inner experience,
 - die Selbstanschauung - is more, and something
 else, than the sum of its differentiated or specially

noted and remembered parts or incidents. ... I maintain that such a synopsis is the prius of all conscious life and that this is developed or resolved only by the acquired processes of differentiating, of analysis and subsequent synthesis. The initial synopsis is what we term the 'I' or Ego, the unity of the sensory continuum. ⁴

"Self-psychology", an American brand of personalistic psychology, takes this continuity as a fundamental fact.

What is called self-psychology, or personalistic psychology, ... is based on the fact that conscious states or processes belong together in a unique way. ⁵

To say that the self is organic means that every phase and experience of the self is so interconnected with every other in the self as a whole that no single experience can be understood until it is interpreted in the light of its membership in the whole self.

The organic nature of the self is, indeed, the most widely agreed on trait of the self among idealists in general. It obviously conforms to the cardinal principle of idealism, namely that of organic logic. ⁶

...The temporal structure of mind as conscious experience is that of a system or organic whole, in which the parts (the successive events) derive their meaning from the whole (the time-transcending act of the mind.) ⁷

⁴ J. F. Merz, op. cit., Proc. Durham U. Philos. Soc., 5, p. 53. 1913.

⁵ E. S. Brightman, Introduction to Philosophy, p. 190.

⁶ E. S. Brightman, "The Finite Self," Contemporary Idealism in America (New York, 1932), p. 173.

⁷ Brightman, Ibid., p. 193.

Subjective individuality is essential if experience is to hang together, as it does, so that passage from part to part within it is possible. The theories to account for this passage are at one in emphasizing the continuity inherent in experience as the ground of whatever empirical unities are found, but it is just this phenomenological continuity which tends to be neglected by atomism and associationism.

The choice among the possible theories to account for the facts of subjective integrity cannot be made on the sole basis of a methodological discussion, and the general metaphysical discussion prerequisite for a reasoned choice is not suitable in this essay. We can conclude, quite generally, that some recognition must be made of the actual continuity and integrity of experience if synopsis is to be regarded as possible and valid, and that some individual metaphysical being not given at least in the particular momentary experience that it is said at any one time to have and to integrate, is assumed as the ground of this integrity. This metaphysical being, as "having" and "holding" together the diversities of experience is the subject in experience, and is absolutely essential to the possibility of any synopsis.

C. The wholeness of the object in synopsis

12. What has been said above concerns the individuality of the experient as presupposed in the wholeness and integrity

of experience. If the experience of complexity in unity, i.e. of individuality, is not a falsification, then wholeness must be a character of at least some real objects. The unity of the mind is not a sufficient condition for the constitution of finite wholes within its content, because the unity belonging to parts of a field of experience is not solely due to their being apprehended by one mind, for this unity pervades all the data of an experient, and we are left only at the level of simplices in a medium. ¹

To determine the real meaning of individuality and to determine what objects are individuals we must seek some criterion for attributing integrity to objects, but this criterion must not be based on some subjective condition such that our criterion does not distinguish between real and phenomenal individuality. ²

¹ It should be remembered that the distinction between whole and medium was not set up as metaphysically final, but was found useful in method. Also it is important to emphasize that a "belonging together" may be attributed by "the unity of mind" to some objects more than to others, namely to gestalten. But the organization of gestalten and the constitutive determination of some meaningful wholes does not rest merely upon the fact that they are in one field of experience, but presupposes a certain affinity among the (elementary) objects.

² The subjectivist would, of course, take exception to this and deny that such a condition could be fulfilled, because the self-preservation of structure, which is taken as the criterion of individuality as real, may be attributed to pseudo-individuals in a way similar to the alleged subjective legislation of the laws for physics. If this objection obtains, then we can speak only of inter-subjective individuality, without reference to a supposed thing-in-itself. If this

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13. That is an individual which preserves itself, asserting its individuality. Like a machine it functions as a whole; unlike a machine, it functions for itself. In it, in Kant's words, every part is reciprocally end and means. Not only does the whole have properties which the parts do not have, but in it the functioning of the parts must be regarded as the means to the preservation of the whole. The parts, as a consequence, show emergent processes, acting differently from the way they would act as elements. ³

† This is a dogmatic definition of individuality, but it is very easy to show how it is related to the critical principle of individuality which can be seen throughout this essay. We cannot assert any ground for the determination of the objectivity of an individual if an individual which is a mere ens rationis can satisfy it. ⁴

point is an objection to our procedure, it depends entirely on the adequacy of subjectivism to differentiate solely within and on the basis of the experiential continuum between wholes as real and as ideal. I contend that subjectivism has no grounds for such a distinction.

³ Cf. Hegel, Phenomenology of Mind (Engl. transl., London, 1931), p. 286; Stern, Person und Sache, 1, 128-138; A. F. Haller, Aeternitas (Oxford, 1930), pp. 151, 205.

⁴ Cf. f.n. 1, p. 143. For the subjectivist, the search for a principle must appear illusory and misguided. But the principle given here will determine for the subjectivist what individual appearances will most nearly fulfil any workable definition of individuality.

Activity may be a mere phenomenon, an appearance created in us; but if the activity is reflexively related to what seems to be its source, the activity must surely be as objective, ~~though no more so,~~ as that which appears to be its generator and its beneficiary. Now, granting that much objectivity to activity and to its reflexive agent, it follows that the principle of individuation which has been expounded here applies without exception to these reflexive agents. By definition the reflexive agent refers to itself in activity, setting itself off from its environment. Where there is this self-reference and intrinsic goal-directedness in self-activity, there must ipso facto be an inhomogeneity between intra-individual relations and contextual relations, though not all relations will be exclusively on one side or the other. This inhomogeneity will show itself in a necessity of a shift in categories of explanation when a movement is made from the world to the individual.

14. In recent years the view that the activity and nature of the part is dependent upon the whole, which is essential to this theory of individuality, has been subjected to a logical criticism by Professor Ralph Barton Perry.⁵ A thorough examination of this criticism is called for. Professor

⁵ R. B. Perry, "A Realistic Theory of Independence," In The New Realism (New York, 1912), pp. 99-151. Particularly pp. 106-113.

Perry reaches the conclusion (p. 151) that dependence is "a special type of relationship in which the dependent contains, implies, or is exclusively caused or implied by that on which it is dependent." This, of course, is no definition, but simply an enumeration of the types of relations he believes he has shown to be relations of dependence.

Let us grant to Professor Perry the validity of his argument that the whole is dependent upon the parts; it contains the parts and without them it is nothing. Now to show that the part is not dependent upon the whole, he attempts to reduce the proposition which states that the part depends on the whole to a form of whole-part dependence. A thing, it is argued, cannot be a part without presupposing a whole of which it is a part. Thus, Professor Perry infers, the "relationship of part to whole" depends upon its terms (a case of whole-part dependence), one of which terms is whole. Therefore, he concludes, the relationship of part to whole is an example of the dependence of whole on part.

This, however, is not equivalent to asserting the dependence of the whole on the part in the case admitted above. We can agree that the complex relationship part-whole is an example of whole-part dependence, but this is irrelevant to the question as to whether part qua part of the whole to which it is related in this complex relationship of part-whole is dependent upon the whole in this complex relationship. That

is to say, let it be granted that "part" of "whole 1" is related to it in such a way that the relationship is another whole ("whole 2"). Now, to assert that whole 2 depends upon whole 1 and part is true but irrelevant to the question as to whether part depends upon whole 1.

Apparently Perry's argument is based on the assumption that a relationship is a whole whose parts are terms. But in the argument he is no longer speaking of the wholes and parts (whole 1 and part) with which he began, but has shifted the context and now is considering whole 1 not as a whole, but merely as a part. ⁶

To identify part with the relation part-whole implies an internal theory of relations which Perry does not seem to me to accept. If, since "part implies a whole of which it is a part", we admit the argument that part and part-related to whole are logically the same, we are not dealing with part qua element, but rather qua term-in-relationship. Thus if there is a difference between part and element, this difference is dependent on (caused or implied exclusively by) whole.

⁶ It may be objected that no one is able, then, to consider a whole as it is a whole, but must always consider it as a part (of a logical or grammatical whole). I have previously admitted this, at least tacitly, in saying that a term is not a pure logical whole (see above, p. 69). But the recognition of a shift of categories from say biology to logic and grammar does not impugn the wholeness of an object in the first categorial scheme. Moreover, we are generally concerned with objects, not terms.

Part implies "whole of which it is a part" and this is equivalent to the tautology, "A part is a part." A whole can be implied by nothing but its parts; thus the whole is dependent upon the parts in the sense of being exclusively implied by them. But the converse also obtains, and the parts depend upon the whole, for the relation of implication is one of dependence. It must be admitted that this is an extraordinary sense of dependence, being like the dependence Perry is forced to admit when on his own principles it is said that his arguments, if valid, depend on the conclusion he draws from them.

An element, as here understood, is not caused by, implied by, or dependent in any other way upon a whole, nor does it in any way imply a whole. But if it is true that a part implies a whole of which it is a part (otherwise it is an element), it is just as true that a whole implies parts to which it is a whole. Qua element a may be the same in the various complexes (a,b,c), (a,d,e), (a,f,g), but qua part it is not logically the same -- i.e. in each case its partiality is implicated by and implicates a different whole. But the important thing to notice is this: Existentially, a may be the same in each case and the same in all cases as it is when alone. This is an empirical question and cannot be answered a priori, and yet an answer is needed to validate the

argument that a part is dependent on or independent of its whole.

The reason for this is obvious; but can Perry ever consider an element not as a part? If a relationship is a whole of which its terms are parts, any entity not to be shown to be related to it by some relation of dependence must be wholly unrelated. The assumption that a relationship is a whole without qualification is fatal to Perry's theory unless it can be shown that there is some element conceivable which is not a part of any relationship whatsoever; and that the part is independent of this logical whole or relationship, to which it belongs as a term.

I submit that Perry has done neither.

Once the question is treated as a logical, rather than an existential one, the attempt to claim independence is bound to fail, if a relationship is regarded as a "logical whole". And when we turn to cosmology, we see the causal dependence of part on whole in biology, psychology, and even perhaps physics, for the emergent processes of the parts are unmistakable. Yet Perry treats any relationship as a whole. This justifies us in saying empirically, as against his view, that parts depend upon wholes. Perhaps this is to say nothing more than that things act differently in different circumstances. But since Perry seems to treat

every relationship as a whole, this obvious fact seems to me to refute his theory. What is said here for the effective relatedness of his wholes and for causal relationships in general is true a fortiori for individuals as conceived here.

15. Having refuted, as I believe, Perry's arguments which would make synopsis as here described useless, for if he were correct a knowledge of an entity could be complete without reference to its partiality in a whole, we turn to consider the presuppositions of the assumption of the validity of synopsis as here defined. These presuppositions have been elaborated by Stern as the foundations of his hypostatic methods.

The first dogma is a thesis concerning wholes and is a statement of the grounds for the properties of wholes previously stated: "Einheitliches Sein (bzw. Geschehen) und einfaches Sein (bzw. Geschehen) ist nicht identisch. Oder: Was in gewissen Beziehungen vielheitlich (analysierbar) ist, kann doch in anderer Beziehung eine reale Einheit sein."

The second dogma is: "Die Positionen schweben über den Relationen. Alle synthetisch gegebenen Positionen betätigen ihr einheitliches Sein und Geschehen an ihren Teilen dadurch, dass sie zwischen deren Zuständen und Geschehnissen Beziehungen (der Vergleichbarkeit, der Gesetzmässigkeit) stiften." ⁷

⁷ W. Stern, Person und Sache, 1, 39, 40. The order of sentences has been changed.

These dogmas can best be applied to the synoptic problem through a distinction which Lloyd Morgan has drawn.⁸ He distinguishes relatedness within a system or context under examination as intrinsic and the relatedness between systems as extrinsic; we must always name the context with which we are dealing when we say that any relation is either intrinsic or extrinsic. It follows that intrinsic relations obtain between entities considered as parts and in contexts or complexes as wholes, and that between wholes qua wholes there are no intrinsic relations; to assert an intrinsic relation between "wholes" is to assert that in this context they are parts of a wider whole. To illustrate these relations, let us take a book. Each page of the book is a physically given whole, and the relations among its parts are intrinsic to them and to it; but the relation of one page to another is an extrinsic relation so long as each page is regarded as a whole, and this relation becomes intrinsic when the pages are seen as parts of a book. Then their relation, in the context of the wider whole, the book, is intrinsic to the pages and the book. The book, in its turn, is a whole

⁸ C. L. Morgan, Emergent Evolution (N. Y., 1926), pp. 69-78. In any objective whole not a sum only, the theses here suppose that there is an "effective relatedness", which means that there is "some change in the existing go of events." (P.20) This is in agreement with Stern (loc. cit.) and Morgan (p. 71). Without this supposition, parts would be existentially the same as elements, and synopsis would be only a process of inference with words, a play with the notion of whole and part.

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which may have extrinsic relations to the other books taken at random (as on a shelf); but if we suppose it is part of a set, then qua part it has some intrinsic relations. To summarize, it may be said that the relations in a whole are intrinsic, and those between wholes are extrinsic, but at least some extrinsic relations can become intrinsic, and this regularly occurs in a process of synopsis which progressively moves to ever larger wholes. Intrinsic relations may become extrinsic when a process of analysis or dissection makes part into whole.

Now, taking Stern's principles and Morgan's terminology, we can state the following thesis: The purpose of synopsis is to examine all the intrinsic relations of its object.

The two principles of Stern give the metaphysical meaning of the word essentially in the definition of synopsis in chapter II.

16. Since objects of perception are not isolated, but are portions of a connected whole, so the relations which we regard as connecting one thing with another have an experiential basis with the relations among the parts of a complex object which we regard as a single thing. Thus extrinsic relations are given in experience with intrinsic relations, and it is demanded in synopsis that the search be directed to higher and more inclusive wholes so that extrinsic relations are progressively made intrinsic.

This movement of thought gives the foundations for systems as types of synopses, as these were examined in chapter II. Qualities are replaced by relations in material and formal systems, and we leave the bare particular in its immediacy and conceptually change its extrinsic relations to intrinsic ones by finding empirical or conceptual wholes which comprehend them.

In experience in which the sensuous element is prominent we are generally content not to correlate all qualities with relations, and hence we do not seek systematic synopses. Regulative synopsis predominates in those regions in which the chief interest is in structure. Where discursive interests predominate, the attempt is made to correlate qualities with quantities of a single sensuous quality such as length, weight, and the like. In any single perspective, that which is essential can, in the advanced stages of a science, be expressed as relations. Thus color as a sight-quality can be ordered only by a cumbersome color-scheme or pyramid; the physicist, on the basis of his measurements, is able to correlate qualities of color with quantitative differences in wave-lengths as shown by variations in a single quality such as the movement of a pointer. In physics, then, this system is substituted for its converse domain. Theodore de Laguna wrote, "While it is true that objects of our experience are never wholly analyzable into relations --

that our world is not a system of relations of relations in which nothing is related -- nevertheless it remains true that the clearer and clearer our conceptions of the world become -- the more nearly they approach the mathematical type -- the more largely they may be expressed in relational terms." ⁹

The last clause from de Laguna's statement indicates an important feature of formal systems as these have been illustrated in pure mathematics. The terms of mathematics have been seen to be nothing apart from their relations. In pure mathematics, a term is originally defined only by way of its relations and elements, and if in the latter way, it is not simple. If it is simple and indefinable in this way, to be of any use in mathematics it must be amenable to a final description according to its uses, that is, by the relations that it has entered. It is progressively defined by its relations, which are intrinsic to the system of which it is a part. ¹⁰

Previously the fact that the formal system is an ideal of science has been emphasized; this is true within each science as well as among the sciences taken collectively. It follows, then, that the various sciences aim at more and

⁹ T. de Laguna, "The Externality of Relations," Philos. Review, 20, 1911, p. 614.

¹⁰ See above, pp. 111-114.

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inclusive wholes whose analytic structures (internal relations) comprehend more and more particulars.¹¹ A formal system is preeminently a manifestation of internal relations.¹²

¹¹ The entire development of modern science is interpreted as a growth of the use of internal relations by Cassirer, Substance and Function, *passim*. Cf. also Whitehead, Science and the Modern World, pp. 180-181; Lewis, Mind and the World Order; E. H. Hollands, "The Externality of Relations", Jour. of Philos., 24, 589-608. The following chapter will continue to deal, in a critical way, with the problems of externality.

¹² Before proceeding further I should indicate what I mean by an internal relation. I use the term only in reference to logical constructions, in a similar manner to my use of Morgan's term "intrinsic relation" in reference to existential data. By an internal relation I mean any relation in which a term is different from what it would be outside that relation, i.e. different in some respect besides merely being in or out of this relation. If this limitation were not made, all relations would necessarily be internal. The relations which I hold to be internal in this sense are identity, difference (from a stated term), similarity (to a stated term), implication, any relations to predicates which define a term. In a definition there is no possibility of omitting any of the stated relations without changing the intension of the concept; thus the nature of the term is different in and out of a certain relation. Indeed, logically it is no longer the same term. It should be observed that G. E. Moore's essay (cf. Philosophical Studies, London, 1922, ch. ix) is not an attack on this simple form of internality. Russell's arguments for the externality of relations (Principles of Mathematics, sects. 212-215) is based on the principle that the sense of relations which define serial order and are thus asymmetrical (cf. Introduction to Mathematical Philosophy, London, 1918, p. 60) involves two terms and cannot be exhaustively analyzed into internal complexities of either term. (Cf. Principles ... vol. 1, pp. 223-224.) Russell, in his definition of internal relation as one implying a complexity in at least one of its terms, does not claim that there are no internal relations. It seems evident to me, though I may be very much in the wrong, that as simple terms having no internal complexity by definition are otherwise indefinable except by the significance of their entry into some relations and their resistance to entry into others, in the end it is necessary to admit a term to be just what it shows itself to be in relations and the variety of relations it enters seems to depend on

Relations are neither mere psychological accretions nor bridges between presentations which are independent of them and of each other, nor logical insertions between terms which are independent of them; rather, they are included in the experiential continuum or the logical system from which "separate things" and "separate terms" are segregated. If all relations were extrinsic or external, in these senses in which the words are used here, all "things" would have to be simple. Thus the conception of intrinsic and internal relations is a presupposition of the assertion that there are complex objects or wholes, and this assertion, it has been shown, is presupposed in synopsis. This theory of intrinsic

something "in" the term.

As implication is an example of an internal relation, so one might suppose that causality would be an intrinsic relation, in the sense used here. This is, in fact, the view of Lotze, Stern, and others; and I have pointed out above that perhaps it follows from some of the details of Perry's argument, though it was certainly not intended by him. I have not included it in the text here, because causal relations appear to hold between wholes. Though I should agree to the metaphysical principle that causation implies a comprehending whole as its ground, the principle is too debatable to base on it, without more discussion than can be given here, an assertion that all search for causal relations is really synoptic. Perhaps in so far as causality is thought of as real efficiency, the proposition might be granted, but the problem with all its difficulties may be included or excluded in the statement that synopsis is a search for all the intrinsic relations of an object. That efficient causality as real entailment is in fact generally regarded as intrinsic, see J. E. Creighton, "The Standpoint of Experience," in his Studies in Speculative Philosophy, p. 90.

and internal relations is the logical meaning of the statement that the object of synopsis must be seen essentially as a whole or a part, the metaphysical meaning of which is given in Stern's two dogmas. In the beginning of chapter II the full meaning of essential could not be given, as it has been delineated here.

D. Synopsis and Acquaintance

17. J. T. Merz held that there were two theses of the synoptic view: (1) that synopsis everywhere precedes analysis and synthesis, and (2) that synopsis reveals or contains more than analysis can ever discover or deal with.¹ Only the second he regarded as essential. The general trend of argument in the present work has tended to put forward the first thesis, and to neglect, to some extent, the second. The second raises the question, "In what unique sense can synopsis claim to have knowledge which analysis cannot deal with?"

If by analysis one means dissection, then obviously gestalt-qualities disappear with the gestalt. Guided by synopsis, four lines may be put together to form a square; and at the moment the square is formed, the quality returns,

¹ J. T. Merz, op. cit., Proc. Durh. U. Philos. Soc. 5, 1913, p. 54.

but it was not put there by synthesis. Since real wholes have properties which parts and their sums do not have, and since knowledge of the whole is at least part of synopsis, it seems to follow that in synopsis we have knowledge of emergent properties of wholes.

This knowledge is undoubtedly given in a synopsis, but it is like the acquaintance which one has of a simple sensation. An emergent or a gestalt-quality is as simple and unanalyzable as a simple sensation. No ultimate distinction can be drawn, metaphysically, between the formal natures of emergent properties of molecules, crystals, cells, or organisms; for they are all alike over-summative properties of wholes, no matter how much they may differ in actual empirical quality. To know an emergent quality it is necessary to have direct acquaintance with it, and to know it is to know something as a whole, because every emergent is a property of a whole. Thus color is an emergent property of certain vibrations integrated in certain ways. The philosopher who holds synopsis to be necessary in knowledge cannot claim that synopsis is defined by any qualitative peculiarity of the object synoptized, unless he is willing to hold also that any acquaintance, even with the most simple sense qualities, which are not apparently correlated with or emergent properties of experiential wholes, is also synoptic. But to extend the meaning of the word synopsis this

widely is to lose its meaning; synopsis becomes equivalent to "-opsis".

18. Though gestalt-qualities, using this word in a broad sense to include all non-summative properties of complex objects, are given in an experience which is at least logically similar to an explicit synopsis, since the object is not simple and a whole is present, still the relations of the parts are not given in an experience of acquaintance with all gestalt-qualities.

To make synopsis distinctive in meaning, it must be emphasized that the most characteristic thing about it is that its object is a gestalt and not that it is a gestalt-quality. A synopsis is necessary in cases even where there is no emergence in the object which appears to sense, as in the case of mathematical wholes; so the synoptic process must be defined by the ambivalence of complexity and unity in the object, rather than by any supposititious peculiarity of its sensuous quality.

We may summarize this as follows: One of the theses is that the peculiarity of wholes which are not sums of part-properties is an object of an act of synopsis, but in itself does not distinguish synopsis from any other kind of acquaintance. It is true that there is in synopsis often an element of immediacy which is not exhausted in any discursive

consideration, but the experience of these gestalt-qualities in synopsis is not generically different from the experience of any other simple quality which cannot itself be adequately described but must be indicated in acquaintance. In other words, the element of immediacy does not distinguish synopsis from any other acquaintance ("-opsis").

What is taken to distinguish synopsis from other kinds of knowledge is the fact that it is a unitary, if not simple, experience of an object which is unitary but not simple. The object owes its complexity to an intrinsic or internal relation to its parts and among its parts; and its extrinsic relations which may be made intrinsic to it account for its duality as both a whole and a part.

If this relation of partiality and wholeness is not taken into account, I do not call the act synoptic, for the presupposition of the synoptist is that an object cannot be understood apart from these relations if it has them. A synopsis is a knowledge of a single complex object -- complex because it has many moments as its parts and many relations as determinative of it, and single because the relations among the moments are not extrinsic connections among independent elements, but are rather internal modifications of a complex unity.

In normal cognition objects, especially spatial objects,

are naturally seen as parts and as wholes, or more often as wholes and as things in a medium. Synopsis is an extension of and emphasis on the whole-part relation and a search for real individuals instead of the hypostatization of any chance constellation of objects as a significant metaphysical individual or whole.

Synopsis is the explication and delineation of the qualitative and relational complexity in integrity at least latent in all cognition in general.

Synopsis does not base its claims exclusively on any alleged inadequacy of other methods of knowledge. The relations of some other methods to synopsis must now be considered.

CHAPTER IV

ABSTRACTION, ANALYSIS, AND SYNTHESIS

1. At the conclusion of the preceding chapter the thesis was offered that synopsis is an explicit apprehension of some features which are present in normal naive cognitive situations. The over-summative property of a whole, whether a gestalt-quality, or an emergent in a narrower sense, the complexity in unity of the object, and the continuity of the cognitive act were shown to be characteristic of cognition in general; and synopsis was regarded as distinctive only in that the latent features of the ambivalence of partiality and totality were made salient and prominent.

It is now necessary to pay attention to some other methods of knowing, methods which may be used without recognition of synopsis, or at least like naive experience in that the synoptic features are not very prominent.

In a manner which will become clear as the study advances, these methods of knowing which are not, at least nominally, synoptical or syngnotical have been pushed to

very great lengths and have performed remarkable services for science. The service thus rendered has made some users of these methods indulge in a "methodological imperialism" no less serious in its implications than some other imperialistic attempts previously considered. In such imperialism, methods are allowed to determine knowledge, and the nature of the object and the varying needs of knowledge are not allowed dominance and the use of methods as their mere servants. Some of those who use these so-called streng wissenschaftliche methods have called other procedures, including synopsis, "intuitive," "poetic," "neo-Hegelian imbecilities," and "semi-mystical rubbish." But that synopsis is capable of a sufficiently rigorous and productive use, it is to be hoped, has been shown.

Methods which have been characterized as specifically different from synopsis are abstraction, description, analysis, and synthesis. By dealing with these methods and ways of knowing together and apart from the constructive consideration of synopsis, I do not mean to indicate that these methods may not involve synopsis; and by contrasting them with synopsis I do not mean to deny their validity in as categorical a fashion as many of their defenders assert it. My purpose in this separation is to show that in these other methods the features characteristic of synopsis are not prominent. It is also my purpose, however, to indicate that these pro-

cedures ^{presuppose} knowledge by synopsis or by perception which has much in common with synopsis, as has been shown; that they are in and by themselves inadequate to the demands one can legitimately make for a "full knowledge" of a thing; and that they must be supplemented by synopsis in order to meet these demands. To use a statement of Bergson's with a slight change (which, however, does not destroy his meaning, but rather includes it) my purpose is to show that one can pass from synopsis to abstraction and analysis, but from these alone one cannot pass to synopsis. ¹

A. Abstraction

2. In chapter II, sections 26 and 27, abstraction was considered in a preliminary way. There it was pointed out that abstraction represents the most elementary form of selecting a group of entities such that all members of the group show at least one feature in common, and that the second grade of complexity is reached when the members of a group are arranged under this universal aspect or feature in an order of quantity or some other asymmetrical transitive relation. It was pointed out that abstraction in this

¹ Cf. H. Bergson, Introduction to Metaphysics, p. 48.

neglects the specificity of knowledge by acquaintance with each member of the group and that the total complexity of the objects in the group is regarded as irrelevant, provided only the common feature is present.

It was further shown that the single object may be a member of various abstractive groups and that the adequacy of abstraction varies directly with the number of abstractions made from the object, that is, with the number of perspectives from which it is viewed; and that the ordering of these perspectives with regard to the manifold of properties of the objects, taking place through some acquaintance, is a synopsis of perspectives, and is presented in a general description of a single item.

These preliminary considerations had to be presented in the foregoing chapter in order to provide a basis for the study of systems as a type of synopsis. In the present chapter it is intended to subject the entire notion of abstraction to a thorough examination, but the preliminary results of the previous discussion will be presupposed.

3. Abstraction isolates in thought that which cannot be or is not actually isolated in presentation or sensuous experience.

Sometimes ¹ the term "abstraction" is applied to the

¹ Cf. F. Seifert, "Zur Psychologie der Abstraktion und der Gestaltauffassung," Zschr. f. Psychol., 78, 1917, 55-144.

separation of conceptual elements. Several facts make me doubt the validity of this. Seifert is obviously referring to "abstractions from abstractions", yet in every case the abstraction from an abstraction can be treated as an abstraction from presentation, only now not as a genus proximum but as a more distant concept. If referred merely to abstractions, we should not have a clear-cut case of abstraction, for the total complexity of an object of abstraction is not lost if it is a concept from which abstraction is made. That is to say, to draw a contrast or a distinction within a genus as an abstract whole is necessary in making abstraction from a species or abstraction to a species; but in this "abstraction" not only the species but also the genus as a whole and its other species are ~~also~~ determined. This is not characteristic of abstraction, but of analysis, as we shall see. It is interesting to observe that abstraction does not seem to have a place in a system of internal relations at all, for any distinction in a formal system limits both the term and its context.

In case abstraction isolates in thought that which cannot be isolated in presentation, it isolates that which is an adjective of a term, which is not presentable as isolated and self-existent;² and thus it concerns itself with

² Some qualities can be presented in isolation, and in these cases the distinction is not sharp. But these qualities which may be presented as substantives are also predicates, and this is not the case with things originally nouns.

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intensions. It moves, for example, from one or many blue objects to a universal of blue which is not sensuously given. This type of abstraction may be referred to as intensional or connotative abstraction, in order to show its difference from a process of abstraction which conceptually isolates in an object or a group of objects that which might have been (but is not) sensuously presented apart from the complex object. This second type of abstraction is directed towards the isolation of nouns, and may be called denotative abstraction.³

Let us observe the relationship between these two. The former deals with adjectives (connotations) which are properties (genera) of the object or objects; the latter deals with nouns (denotations) which are parts of the object

³ The rather clumsy name "denotative" has to be used instead of the more euphonic "extensional" in order to avoid confusion with Whitehead's "extensive abstraction", which is quite different. Cf. The Concept of Nature (Cambridge, 1930), ch. iv. In fact, Russell is quite right in saying that "extensive abstraction" is "a method which dispenses with abstraction". The abstraction we are concerned with is based on the classical logic of predication; Whitehead's procedure is based on the logic of asymmetrical relations, and substitutes membership and routes of approximation for common qualities, whose hypostasis involves predication. Cf. Russell, "Logical Atomism," Contemporary British Philosophy (2 vols., London, 1925), vol. i, p. 363, and Our Knowledge of the External World as a Field for Scientific Method in Philosophy, p. 43. Extensive abstraction is used by C. D. Broad (Scientific Thought, N.Y., 1927, pp. 49-50) to show the empirical reference of mathematical constructions, and this cannot be carried out without the aid of intuition of the goal of the process as giving direction to the route, and reference is needed to a notion such as the "inclusion of similars." The role of similarity in this scheme, however, is a very difficult question.

or objects. An adjective, qua adjective cannot be presented alone, while a noun has an at least problematical presentability. These are the differences between the two types; they are similar, however, in that in intension the genus is a part of the species, and other adjectives must be added to the genus to define the species; and in extension, the part is not the entire whole but must be complemented by other nouns to constitute it.

Another dichotomous classification of modes of abstraction is important. If abstraction leads to the conceptual isolation of some property or feature or part from the total complexity of the perception of a single complex object, the abstraction is called isolating. The possibility of isolating abstraction lies in a distinction of some features of objects by comparing them, at least in memory, with other similar but not identical data; thus isolating abstraction presupposes a second type of abstraction which may be called generalizing abstraction. In this case we are dealing explicitly with a series of objects, and generalizing abstraction involves a conceptual isolation and an assertion of the community of a plurality of objects under one universal. ⁴

⁴ It was asserted that isolating abstraction presupposes generalizing abstraction when it is concerned with "some features of the object." This requires some limitation. If some features are spatial figures, such comparison is probably not necessary, on account of the relative unimportant influence of expectation and familiarity as gestalt-factors. Cf. above, p. 51. Isolating intensional abstraction does presuppose generalizing intensional abstraction. Cf. Ribot, Essay on the Creative Imagination, (Engl. transl., Chicago, 1906), p. 21.

In either case, it is characteristic of abstraction that it neglects the total complexity of the object or objects; and generalizing abstraction neglects indeed all individual peculiarities.

In denotative isolating abstraction there are again two possibilities. In abstraction proper, the object is made to undergo the conceptual isolation of its part; but if the part is actually separated from its whole we are no longer using a procedure of strict abstraction, as defined above, but extraction. Extraction might be called empirical abstraction and contrasted with the other types as conceptual abstraction if one desires to show their relationships quite clearly. In the conceptual cases, the abstraction is performed by the selective attention which isolates one part or property which is of interest; in the empirical case, which will concern us in detail later, attention and interest are the ground of an empirical operation. Extraction is not itself a process of knowing, but a physical operation. It becomes significant for the methodology of knowing when the "extract" is interpreted in a certain way, to be discussed later; extraction then becomes the first step in a procedure we may call empirical analysis.

4. It is obvious that in sensuous presentation many similar and many different things may be given, without a presentation of their likenesses and differences being given

along with the similar and different items. A and B are different, but in the most elementary form of presentation a difference of A from B is not given as an item or element of presentation along with either A or B. Though common sense and many philosophers are perhaps too intellectualistic in their interpretation of sensuous experience, it is not to be doubted that the "perception" of similarity is due to memory and comparison of some sort, which are not on the same level of process as presentation.⁵ But it cannot be thought that in A and B there are not these similarities are differences apart from the process of attributing to them such relations by a knowing subject. To say that the relations are merely read into them by finite mind is metaphysically impossible if taken in a broad generality.⁶

⁵ Some restriction is needed. If, for example, two tones are given within a short time-span, the psychological present, phenomenologically their difference or sameness is perceived immediately.

⁶ The Aristotelian logic is based on a presupposition of a discontinuity between what is given and what is done with it in knowledge; Aristotle says that memory is the first stand of a universal. Between a real level of immediacy and a real level of organization, Aristotle supposes there to be a break. That is, the Aristotelian subject-predicate logic involves a substantiality not reducible to a functional meeting point of relations. But the induction for a universal demands similarity of elements. The relationship of similarity was not treated as a relation primarily between things or between complexes of other relations, but rather as the possession of or participation in a genus formally and experientially identical in all examples. A more positivistic logic rejects the notion of substantiality not exhausted in function, but in making its universals, similarity is necessary for the extension of a class; but this similarity is supposed not to obtain through possession by two different substances of one identical substantial form, but rather in a general isomorphism between

Yet in a very real sense what relations of identity or similarity we find among things depend to a large extent upon the mind that knows, for the process of acknowledging similarities is not without motivation, and the abstraction of similarities among various objects presupposes a purposive standpoint from which the process is carried out. For the tired man, a throne and a rough boulder are both places to sit. In the process of making definitions, however, which may give what is "essential" in the object or what is most significant in our knowledge of it, we are not content to abstract just any property from various objects and call that their genus; if that were so, we should be satisfied with the definition of man as a bird, seeing that he has but two legs. Actually in our intellectual endeavors we attempt to make abstractions from standpoints which we suppose to be most generally fruitful and to require least revision as more and more minute abstractions are made; one may say that in abstracting, we try to be as little abstract as possible, and we actually prefer the genus proximum to any other. First of all we take socially accepted standpoints, so that our

other relations. That this isomorphism is implicit in the sensuous has been shown at length. The elementary immediacy presupposed in any disjunction between the formal and the sensuous occurs only as itself a construction of two abstractions, and it is to commit the fallacy of "misplaced concreteness" to suppose that it is prior, and that experience is a product.

abstractions and the resulting classifications under genera may not be altogether personal, subjective, and incomprehensible to others. The throne and the rock are not generally classified together in some single group such as "resting place", because of the pragmatic poverty of such classification. It is, however, one of the central features of originality of thought that new abstractions which are useful are made, and wit, perhaps, is chiefly characterized by an ability to make startling abstractions.

Nevertheless, in abstractions even of such magnitude and universality as that involved in the construction of a table of categories, the process cannot be carried out without some particular attitude and interest. But what is distinctive in this case is a more firm belief in the lasting significance of some points for abstraction as contrasted with a momentary, opportunistic abstraction from some peculiar and relatively insignificant standpoint for some equally trivial purpose.

The spectre of subjectivity does not render it impossible to assert some abstractions to be more true to reality than others, though, if "true to reality" is not taken in a very formal and abstract sense; all rational procedure bases itself on the assumption that what we must think when we are thinking at our "best" and most comprehensively is characteristic of the object of which we are thinking. The abstractions "subject" and "object" are supposed to give us an indication

of some character of the real world notwithstanding the fact that they are made from some standpoint which might, conceivably, not be taken. A meaningful kind of abstraction, involved in some not primarily arbitrary definition, presupposes some criterion for determining the principal element of the object from which the abstraction is made, and this particular standpoint is not determined by abstraction, but itself determines the procedure of abstraction. It in turn is determined by the particular purposes of the process of knowledge at that time, and it may change. That is to say, abstraction is not self-sufficient and an end in itself, but is based on something else and is performed for the sake of something else.

5. On the object side, we find that abstraction begins with a whole, either in extension or intension. The process of abstraction begins with the knowledge of a whole, for without the whole it has nothing to work on; otherwise the object of knowledge would be an indivisible (logically simple or having only one empirical feature) entity from which a part, either a logical component or an empirical component, could not be abstracted. We cannot abstract common parts, or parts of a single thing, unless these objects do have parts or a variety of qualities. It should be noted that in any case we cannot point to objects which have only one property

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(sensations, for example, have attributes or dimensions) or which do not have at least spatial parts; where this is apparently not the case (e.g. points) we are actually dealing with a product of a process of abstraction already performed. It is recognized, too, that the definition by genus and differentia is inapplicable to the summum genus which is taken as the end point of a process of abstraction, simple since it has no further logical components, and thus strictly undefined.

To keep the object in knowledge from falling apart, as it were, into its parts and properties, to preserve it as a single thing in spite of its manifoldness, is the role of synopsis as it has been considered in the preceding chapter. Synopsis is the methodologically prior step to abstraction; and as such it means an assurance that our abstractions are made from and are regarded as being made from one or a number of complex objects. In a word, synopsis assures us that we are dealing with abstractions and not the real thing-in-itself.

6. It is interesting to observe the fate of nouns and adjectives abstracted from a complex object. In every act of abstraction, the parts or features distinguished are not placed in complete isolation; depending upon the purpose of the abstraction, they are subject to an hypostatization or construction which makes them parts of something else. Thus the sensory blue, on abstraction from an object in which it

occurs, becomes an example of a universal of a color, and perhaps takes its place in a color-scheme. This process correlative with abstraction may be called after Paulhan "analytic synthesis" to distinguish it from the explicit synthesis which may be the real goal of some knowing process.⁷

The type of analytic synthesis desired in knowledge is frequently the determining ground for the making of an abstraction. That is to say, abstraction is not an end in itself but a means to an end, and frequently this end is a form of analytic synthesis. The purpose of an abstraction of a term from one complex, when that term is named, may be the illustration of a universal and the consequent subsumption of the complex under this universal as its genus.

7. We may indicate at least two levels in the complexity of the product of abstraction. In one case, a single object is or many objects are observed and a single adjective (e.g., color) is abstracted and universalized. This universalization and consequent transition from an adjective modifying a noun to a substantive (blue as an adjective becomes a name, such as the blue) is the analytic synthesis of hypostatization. Frequently, however, abstractions are not made for so simple an object as a single adjective, for we may be interested in

⁷ Fr. Paulhan, Analyses et esprits synthétiques (Paris, 1938), pp. 29, 32; Les Puissances de l'abstraction (Paris, 1938), p. 41.

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a complex of adjectives and nouns within a larger whole, or common to many wholes. This occurs, when, for example, one recognizes the species of a flower, not by its mere color or mere shape or any other simple quality, nor by attending to the individual peculiarities of size, shape, shade, etc. Rather, abstraction is made for a constellation of features which are regarded as collectively common and distinctive of a universal under which this particular may be subsumed.

We may distinguish these two types of abstraction as ultimate and proximate. This distinction though useful cannot be unambiguously applied in some cases on account of the almost unavoidable difficulties in the meaning of the word simple. Whether any abstraction is ultimate will depend on the criterion of simplicity which is taken. Thus by Titchener, the abstraction of a sensation may be considered an ultimate abstraction; by Holt and Münsterberg, who did not define simplicity in phenomenological terms, it would be regarded as only a proximate abstraction. Generally, however, from the standpoint which is taken as the præ of abstraction the criterion of simplicity can be inferred, and what is simple for one science may be complex for another.

In any one context, proximate abstractions are looked upon frequently as mere points of transition to the real desiderata, a set of ultimate abstractions. This is not

always the case, however; since a noun is, logically considered, a complex of adjectives, it follows that denotative abstraction can never be ultimate unless some simple existent as a single substantial quality exhausting its nature can be found. In studies of forms of organization, it is only a proximate abstraction which is wanted, if organization itself is not regarded as a simple term in a whole. Bogdanow lays great emphasis on this type of abstraction in his general theory of organization (tectology). Proximate abstraction as applied to organization per se he calls "tectological abstraction." "Um in das Gebiet der eigentlichen Tektologie zu gelangen, muss man sich von dem konkreten physiologischen Charakter der Elemente abstrahieren, sie durch ein abstraktes Schema ausdrücken. Dieses Schema wollen wir mit anderen ähnlich gewonnenen Schemata vergleichen und auf diese Weise tektologische Verallgemeinerungen ausarbeiten, die eine Vorstellung von den Formen und Typen der Organisationen geben." ⁸

8. Tectological abstraction raises several problems of a terminological nature. One may ask, for example, how does tectological abstraction differ from a synopsis or synopsis, seeing that it deals with a part of a wider whole, and in turn observes its internal parts and organization? The chief dif-

⁸ A. Bogdanow, Allgemeine Organisationslehre: Tektologie. (German transl., Berlin, 1936), 1, 75.

ference is that abstraction of whatever kind tends to -- and indeed attempts to -- direct attention away from a given whole to a part, so that the specificity of the original given whole, though acknowledged to exist, is inevitably disregarded. The specific part, which in tectological abstraction is an organization, is in its turn examined, but in this step our attention is again shifted from any given whole or part and directed towards a general schema of organization common to all or many wholes. Tectological abstraction and proximate abstraction in general are not so much synopses as mere abstractions which have not gone to a final limit.

It is not to be denied that tectological abstraction is more nearly adequate knowledge of a whole than an ultimate adjectival abstraction. Such abstraction is closer to synopsis in that both its starting point and its product are complex objects, but it fails to be synoptical in the fullest sense since the specific object it hypostatizes is abstracted from the specificity of any particular existent organized whole. The "object" with which it ends is merely an abstract schema of general organization, not a particular existent part of any whole.

In any abstraction whatsoever, the richness of any single observation, whether this be due to an emergent property or to a specificity of organization, is neglected. The product is always an abstract universal defining a class of similar

things, even though it may itself be complex and subject to analysis. Within the complex which has been abstracted the parts may have relationships of mutual implication so that it may be possible to speak of the universal as a concrete one, but the object with which the abstraction began, an individual or group of individuals, is neglected so that it is not included in the universal in the way a concrete universal or a formal system of internal-relations includes its particulars. A tectological abstraction of a geometrical figure could only give a statement such that mere abstract definitions are possible; but in a formal system of geometry the entire geometrical specificity of any possible figure is included.

Hans Heyse has said,

Die Grenzen [des Abstraktionsbegriffs] bestehen nämlich darin, dass in ihm selbst die jegliche Erkenntnistragende Korrelation des Allgemeinen und des Besonderen nicht durchgeführt ist. Denn in dieser Korrelation wird ... das Besondere in seiner Wesenheit als Besonderes vernachlässigt. Es wird nur auf das Allgemeine reflektiert, das eben ohne die Korrelation zu dem Besonderen zu singulären, ja zufälligen Gesichtspunkten verengt wird. So beruht es in dem ursprünglichen Wesen des Abstraktsbegriff, dass in ihm der Rückgang zu der vollen Konkretion des Besonderen unmöglich ist. ⁹

The result of abstraction is an assertion of a feature

⁹ Hans Heyse, Der Begriff der Ganzheit und die Kantische Philosophie, p. 8.

or a part of the single whole or common to many such, so that the particular is now subsumed under some one of its aspects taken as a universal.

Abstractness by itself fails to be complete knowledge of a thing just because it neglects some of the features or parts of its object. If knowledge by abstraction aims at being comprehensive, many abstractions must be taken, and these must be related or seen together if the whole is to be known at all in abstract terms. Thus the description of an object is a peculiar ordering of abstract terms which severally apply to many objects, whose application collectively is restricted to one object by their selection and order. When abstractions are arranged in a proper order for giving a knowledge of the whole object, this is possible by a process of synopsis correcting and guiding the arrangement of perspectives, aspects, properties, or parts; this description when complete will be the report of a synopsis as acquaintance, and will be formally like a description of a complete analysis, if the parts and their relations and the quality of the whole are supposed to be given in all these cases. ¹⁰

The chief epistemological inadequacy in abstraction is

¹⁰ The various interrelations of these methods will be considered in detail below in sections 15 and 18.

found in the way it neglects order. For example, suppose we have three objects in their relations constituting a whole such that $A_r(xR_1yR_2z)$. Abstraction will be indebted to synopsis for A_r , and it will discover in A x and y and z and R_1 and R_2 . Ultimate abstraction cannot determine the order of terms and the way in which they are related, and it falsifies a whole since it changes relations into terms.¹¹ Proximate or tectological abstraction does not disintegrate the whole to this extent, but abstraction remaining on this level is not as penetrating as it might be or as the object allows; where proximate abstraction is brought to a conclusion depends upon the need for preserving, even in an abstract schema, the insight into the organization of a whole which only synopsis can grant.

9. In addition to the neglect of arrangement by all complete abstraction, there is a serious inadequacy of all types of abstraction in that they fail to exhaust the peculiarity of the individual, and nomothetic determination is never complete in actual practice. This should be kept in mind when interpreting scientific constructs and concepts, though frequently it is forgotten with sad consequences for cosmology. The neglect of individuality by abstraction which masquerades

¹¹ Cf. Bradley, "On Appearance, Error, and Contradiction," Mind, n.s. xix, 1910, p. 179 (n.v.); Moore, Philosophical Studies, pp. 277-278; Russell, Principles of Mathematics, i, 141.

as complete knowledge, exhausting its object, has been called the "fallacy of misplaced concreteness" by Whitehead ¹² and the "error of abstraction" by Smuts. ¹³ It is a case of "abstractive imperialism."

About the turn of the century, in reaction to the current naturalism which was based on the attribution of concreteness and metaphysical priority to abstract constructions as contrasted with empirical data, the atomic theory, both in psychology and physics, came in for criticism on the basis of their abstractive imperialism. Ritter, a little later, characterized the whole movement which was found objectionable in saying of the elementarist, "Atoms are more real to his mind than are lands and waters, plants and animals." ¹⁴ Münsterberg, though an extreme atomist in his scientific work, wrote:

Natural science considers the world as a mechanism, and for that purpose transforms the reality in a most complicated and ingenious way. It puts in the place of the perceivable objects unperceivable atoms which are merely products of mathematical construction quite unlike any known thing; and nevertheless these atoms are scientifically true, as their construction is necessary for that special logical purpose.

.....

In the same way, psychology is right, but the psychologism which considers the psychological elements and their mechanism as reality is wrong from its root to its top, and this psychologism

¹² A. N. Whitehead, Science and the Modern World, pp. 84-85.

¹³ J. C. Smuts, Holism and Evolution, p. 20.

¹⁴ W. E. Ritter, The Unity of the Organism, ii, 160.

is not a bit better than materialism. ... The psychological mechanism has no advantage over the physical one; both mean a dead world without ends and values -- laws but no duties; effects but no purposes; causes, but no ideals. ¹⁵

And of physics, James Ward wrote,

As in other cases admitting of statistical treatment, so here [in the problem of the uniformity of molecules and implications for the problem of freedom] the physicist is free to regard all molecules of a class as exactly like his mean or average molecule. But he is not entitled to let this abstract simplification harden into concrete fact. Perhaps it may be thought that such rigorism is pedantic. So far as any particular physical inquiry is concerned it may be, but I am doubtful even of this. At all events, if such unwarrantable concreting of abstracts is to lead logically to a mechanical theory of the universe, we do well to take note of it. ¹⁶

The danger of scientific imperialism arises in its misplaced concreteness, and in its interpretation of the world as though it were nothing but what abstractions in the various sciences show it to be in part. A quotation from Stern may serve as a summary of our argument:

Es war eine merkwürdige Selbsttäuschung der physikalisch-mechanischen (impersonalistischen) Betrachtungsweise, dass sie das, was nur unterster, nie realisierbarer Grenzbegriff des Denkens ist, das absolute Vergleichbare, zum alleinigen metaphysischen Seinsprinzip machen wollte. ¹⁷

¹⁵ Hugo Münsterberg, Psychology and Life (N.Y., 1899), pp. 30, 31.

¹⁶ James Ward, Naturalism and Agnosticism (2 vols., N.Y. and London, 1899), i, 109-110.

¹⁷ W. Stern, Person und Sache, i, 355.

B. Extraction: Analysis as Procedure

10. In the preceding section abstraction was considered as a separation in thought of an extensional or intensional part from a whole which is not separated in presentation. Under the names extraction and decomposition it is necessary to consider the cases in which extensional parts are separated in presentation itself. The means of this extraction are a partial or complete decomposition of the whole, and it occurs in an experiment in which "something is done to" the original whole. There are many degrees of violence done to a whole, and we may arrange all extractions in an order with two poles: one closer to abstraction in which a single part is separated (e.g. the filtering of a chemical compound), and one closer to analysis, as in a carefully controlled chemical "analysis" in which we learn of components and their relationships.

First of all, let us give Eisler's definition: "Abstrahieren -- Dekomponieren: Die Trennung einer Sache von einer anderen, deren Teil sie ist." It should be noticed that much of what is called analysis is actually included under this definition, and also that decomposition may be considered a type of abstraction.¹ The relations of abstraction and extraction

¹ R. Eisler, Wörterbuch der philosophischen Begriffe, I, p. 8. Needless to say, I do not accept the equation of abstraction with decomposition. But see above, p. 169.

to analysis can be made clear only as we advance to the following sections. Here we shall illustrate extraction by reference to two fields of science -- psychology and chemistry. Holt wrote, "...The analysis of conscious qualities is precisely like the analysis of chemicals; if careful study yields an analysis, the phenomenon was not simple; if components are not isolated, the phenomenon may be simple, or it may yet be analysed by further study."²

11. Vaihinger says that abstractions, and this includes extractions, are useful fictions, "wenn auch in der oft erfolgenden Hypostasierung des Abstrakten zu Realem oder Selbständigem Gefahren bestehen."³ That this danger has not been withstood was pointed out in the previous section in regard to abstraction by Münsterberg, Ward, and Stern; in regard to extractions proper, it was not escaped in the classical experimental psychology. Münsterberg recognized two things which were frequently neglected: the psychological elements were not given in experience as such but were constructions of a logical nature involving an hypostasis of some necessary conditions of sensory experience, and the methodological restrictions in the discovery or invention of these elements were sufficient proof of their

² E. B. Holt, in The New Realism, p. 333.

³ Hans Vaihinger, Die Philosophie des Als-Ob (1911), p. 383; cited in Eisler, Wörterbuch der Philosophie.

artificiality and of the danger of substituting them or the psychology based on them for the facts of naive experience (Erleben, for Dilthey) and a more immediate knowledge of man as that is obtained in understanding. When psychology was limited merely to a study of these elements, however, it must have been seen to be an abortive science, or else its elements must have been presumed to be primary and necessary for a general knowledge of man, as his real constituents. Needless to say, the classical psychologists, if for no other reason than to save their own professional skins, generally chose the latter alternative.

When the psychological elements are thought to be sensations, feelings, and images, or reflexes, they are undoubtedly real; but, we ask, what is their significance? Koffka writes:

The concept of sensation is the outcome of the analytic attitude. Sensations are real, but are not equivalent to the realities of our everyday phenomenal world. Being a reality, being a process producible under certain well-established conditions, sensation is worthy of study. The investigation of sensation may even help us to understand better the laws of other and more natural phenomena, but it will not do so if the sensation is treated according to the teaching of traditional psychology, as a mental element.⁴

⁴ Kurt Koffka, "Introspection and the Method of Psychology", Brit. Jour. of Psych., 15, 1924, p. 158. Quoted in G. W. Hartmann, Gestalt Psychology (N.Y., 1935), p. 290 n. Cf. also A. J. Harris, "Analysis: A Contribution to Psychological Method," Psych. Rev., 36, 1929, p. 7.

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... of the degree of objectivity, then it is
 ... based on them for the sake of naive experience
 ... (for theory) and a more limited knowledge of man
 ... in understanding, when psychology
 ... study of these elements, however it
 ... as an objective science, or else it
 ... been chosen to be primary and necessary
 ... as his real commitment.
 ... the classical psychologists it for no other
 ... their own professional skills, general
 ... of objective

... psychological elements are thought to be subjective
 ... and images, or not even, they are undoubtedly real
 ... that is their objectivity? Kelvin writes:

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 ... even help us to understand better
 ... elements, but it
 ... is treated according
 ... of sensation psychology, as a

The "Introduction and the use of psychology"
 ... in ...
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The disintegration into a plurality of simple contents, the "becoming sensations", is one, and an important, process which the sensory field undergoes, but this is not to assert that the brass-instrument psychology is giving us in isolation as an element the thing with which we began in naive experience. Lewin has reminded us that the descent from a synopsis to a specialization or isolation cannot always be regarded as a mere separation of some of the objects present in the synopsis.

Die Spezialisierung darf nicht vergessen lassen, sondern muss es um so mehr deutlicher bewusst machen, dass der einzelne Untersuchungsgegenstand so, wie er konkret auftritt, eingebettet ist in ein erkenntnistheoretisches Umfeld. Ja nicht selten stellt er ein unselbständiges Moment in einem umfassenden Ganzen ... dar, aus der er nicht beliebig herausgelöst werden kann, ohne sich von Grund aus zu ändern.⁵

That the parts are changed in the process of specialization, as Lewin calls it, or isolation, which is the highly complex method of introspection as performed by the classical school of psychology, can no longer be doubted. While no doubt the discoveries of this school are valuable in showing what the field becomes when chopped into little bits, they do

⁵ Kurt Lewin, "Idee und Aufgabe der vergleichenden Wissenschaftslehre", Symposion, 2. Heft, 1926, p. 84. Lewin uses the words "umfassende Zusammenschau" for what I refer to as synopsis.

not show what the field is, or that the little bits are the same when seen through naive and Wundtian eyes, or what effect, if any, the field exerts on the parts later isolated. Unless the elements can be shown to be unaffected by the process of discovery, or unless a check-up can be made so that a correction can be introduced conceptually after the process has been performed, the method cannot legitimately be used in inferring the "real" (i.e. not due to the "stimulus fallacy" of Titchener or the "propensity to feign" of Hume) elements of normal experience to be the same as those which have been gotten out of it by decomposition. And the necessity of introducing some conceptual correction "after the fact", though it saves the psychology, condemns the artificial introspective methods.

It is well to indicate a few recent discoveries which show the effect of a field on some smaller parts of it, which effects, of course, are lost when the field is not phenomenally present, as in the case of the classical introspective technique for the discovery of elements. Rubin discovered that color constancy is higher on figure than on ground; Gelb and Granit discovered that the color limen was higher on the figure; Frank pointed out the greater vividness of after images when thrown on figure than when thrown on ground.⁶

Footnote 6: W. Koehler, Gestalt Psychology, pp. 220-221.

George W. Hartmann, in his Gestalt Psychology, to which reference has already been made, summarizes much research in this field. He points out that a contour, whether black or white, makes the color within the figure darker (p.111); the response to a note in a melody is not the same as the response to the note alone or in a mass of tones not harmonically related (p. 137); there are pathological cases in which an "element" is not seen unless it is contained in a configuration.⁷ Katz's law states that the color quality of objects under non-normal illumination approaches the color-quality of the objects' appearance under normal illumination in proportion to the increase of area of the visible field affected by the non-normal illumination (p. 22). A striking example is that in which a figure is completed though part of it is exposed to the blindspot, so that part of it is not seen unless it is seen as a part of a figure. Another example is the fact that the color of an object will be changed if it is regarded successively as a part of various gestalten with different color schemes. All cases of color and brightness contrast belong here, too. Extraction must necessarily neglect these differences; if the correction is made it is on the basis of a comparison of the results of introspection with

⁷ Hartmann, op. cit., p. 245. This result is cited from Fuchs, but William James pointed out the same thing. Cf. Principles of Psychology, vol. ii, p. 608.

the data of "direct experience" or Erleben; yet the difference between the data of direct experience and the results of introspection were regarded by Titchener as due to a stimulus fallacy and a misapplication of meaning in direct experience. It is possible to say, though, that the belief that the stimulus fallacy is a fallacy is due to Titchener's own "fallacy of misplaced concreteness."

12. For other examples of the same dangers in extraction we may turn to chemistry. Here, however, we are faced with the further technical difficulty that we cannot compare the "element" ³ we have extracted with what was the original "part" we wished to determine, for extraction of some kind is our only method of knowing what might be a part to start off with; our only check on extraction is another extraction. This is of no consequence in most cases, for the only thing which interests the chemist is what a chemical compound becomes, not what it is in itself; our sole knowledge of chemical substance is a knowledge of chemical function, and to the chemist a question as to what a stuff is appears meaningless if it asks for more than a statement of the way this stuff becomes some other stuff.

The chemist's report as to what the organism is, or what is in the organism, is merely a statement of what he has

³ Not element in the chemical sense exclusively; cf. above, p. 127.

gotten out of it. "That these reports come near setting forth what the organism actually is the naturalist is bound to recognize cannot be the case." ⁹ "No chemical compounds as complex as the natural proteins are found elsewhere in nature [than in living bodies], or have yet been made artificially in the laboratory. And the still more complex combinations in which these occur in the living cell are as yet not even fully known, as our methods of extracting them break up these unstable complexes." ¹⁰ Sometimes it is stated that chemical processes in the organism are the same as those out of it; in fact this is a tautology, ¹¹ and many vitalists recognize the conditions,

⁹ Aitter, The Unity of The Organism, 1, 76. Cf. W. B. Cannon, The Wisdom of the Body (N. Y., 1932), p. 101; J. H. Woodger, "Some Problems of Biological Methodology", Proc. Aristot. Soc., n.s., 39, p. 352. Needham refers to the changes which take place in protoplasm due to the conditions under which it is studied as the "thanatological limitation", and points out how these are being overcome through new methods of research. See Order and Life, p. 132 etc.

¹⁰ Plunkett, Elements of Modern Biology, (N. Y., 1930), p. 47. A similar situation is present in modern physics since the instrument of research has an appreciable and incorrigible effect on the electron. It is present, but corrigible, in other fields of physics, such as in an experiment in which a circuit is tapped to determine its charge.

¹¹ "Wenn in gewissen Sinne mit Recht gesagt wird, das wirkliche Geschehen verläuft nicht nur nach den abstrakten Gesetzen der Mechanik, sondern wird durch andere Faktoren mitbestimmt, so darf doch diese Behauptung nicht so interpretiert werden, als ob sie das mechanische Geschehen an sich schon ein vitalistisches Geschehen wäre, das in seinem Laufe durch andere, ihm übergeordnete Kräfte modifiziert werden könnte." - Richard Kroner, Zweck und Gesetz in der Biologie (Tübingen, 1913), p. 42.

but also the limitations of chemical explanation of biological processes.¹² But have we any way to show that the tautology involved in saying that chemical processes in the organism are explicable according to the laws of chemistry is significant for science? In a word, is our tautology an expression that is meaningful for physiology?

What is analyzed is killed, and sometimes the whole organism is killed in the process. But, says Williams,

It is possible for the chemist to kill living matter or protoplasm for analysis, using means which should not bring about changes of a strictly chemical nature. Thus if a live tissue is frozen suddenly, using ideally liquid helium, the temperature would be such that chemical changes would be immediately arrested and the chemical components of the frozen dead mass should be the same as those of the original living protoplasm. ...

The killing of living matter may be likened to the destruction of a painting. If a painting is torn to shreds its existence as a painting ends, yet the chemical substances which enter into the composition of the pigments, and the canvas may remain entirely unaltered.¹³

It must be observed, however, that even with the process of freezing, which Williams mentions, we cannot be sure that our analysis is correct, though no one would claim, I suppose, that life is due to some particular "living chemical substance"; it is the organization of chemical and colloidal substances

¹² Cf. for example, The World as Will an Idea, pt. II, sect. 27.

¹³ Roger J. Williams, An Introduction to Biochemistry, (N. Y., 1931), pp. 157-158.

which is perhaps the real object of our search; colloids would be radically changed through such treatment. But are we any better protected from mistakes on the purely chemical level? The method of chemical analysis depends upon the possibility of chemical reactions which cannot be carried out at the temperature of liquid helium; and the chemical changes which are immediately arrested at death must be set in action again before we can analyse the dead mass. At this point we have no way of knowing that the chemical constitution of the melting mass is the same as that of the original living protoplasm. The act of violence done to the living tissue probably only adds to the epistemological difficulties in chemical analysis in general, which must be examined.

The objection which is made to Williams' defense of the method of physiological chemistry, though, is not unique, but obtains likewise for the fundamental principles of chemical analysis in general.

13. Chemical analysis also involves "doing something" to an object. The analytical synthesis which was found to be an instrument in abstraction is likewise a means in decomposition. Thus in chemical analysis it is not usual that a compound ABC can be simply disintegrated into its elements A, B, and C. The usual form of chemical analysis would be to add compounds to ABC which have a higher affinity

for the several elements than they have among themselves, with the result that ABC, when the compounds DE and FG are added, is transformed into ADE, BFG, and C. In general, the process of chemical analysis into elements is carried on in this way. Suppose we wish now to isolate A. Suppose then that ABC reacts with DE so that AE and BCD are formed; the particular compound DE is chosen such that the ion -BC will have a greater affinity for D than it has for A, and such that AE is a relatively unstable combination and one easily separable from BCD. Now by treating AE with XY, which has a high affinity for E, a compound EXY will be formed, and n atoms of A will form themselves into n/v molecules of A, v being a periodic function of the element. These molecules will be removed from the field of action by volatilization or precipitation, so that they cannot react with EXY and "reverse the reaction."

If a similar process is carried out with reference to B and C, it is finally possible to say that in a compound, whose composition we did not know, there were A, B, and C, if we can identify the end product as these elements. The process can be so performed as to show the relative amounts of these elements, so that we can say that the compound was, for example, A_2BC_4 .

Chemists draw a distinction between "proximate" and "ultimate" analysis; the former goes only so far as to produce some compound which is easily recognized so that it is not

necessary to go all the way to elements in order to say what the original compound was. Here one may note a similarity to types of abstraction already noticed. ¹⁴

The determinate way in which compound A becomes compounds B and C, whose composition, constitution, and quantity we know, may give us evidence of the constitution as well as the composition of A. This procedure is of utmost importance in organic chemistry, and most nearly reaches, in its achievement, the analytic ideal of knowledge of structure and composition. ¹⁵

14. But three features of this procedure require critical comment. First, the violence done to the starting point leads us to say that the compound was so and so. We do not know what it is, or at least we know a priori it cannot be now what we say it was, for it has shown itself to have been one stuff by becoming a different stuff in a distinctive way. If we have a gram of a compound, analyse half of it and find that this was hydrochloric acid, we conclude that the other half-gram is hydrochloric acid; but this conclusion

¹⁴ Professor Julius Stieglitz, the distinguished chemist of the University of Chicago, writing in the New York Times for November 22, 1936, says that one of "the most significant points of view which chemistry has to offer the modern world" is "a critical parallel between the methods and processes of analysis in mental processes (logic) and the chemist's methods of analysis of the earth's matter."

¹⁵ The value of proximate analyses in chemistry depends largely upon the theory of radicals. Perhaps here we are dealing with a kind of "tectological" analysis or extraction, working with common forms of chemical organization.

is reached not by the process we are here considering but by mere induction, depending upon the assumption of the original homogeneity of the sample with the remainder, and also on the assumption that the remainder is stable. That we cannot assume either in many types of work is obvious. In other words, analysis of this kind gives us knowledge of what has been, but it alone says nothing about what is, for when it goes to work, the is is changed into a was.

Second, we have supposed that analysis differs from abstraction, either denotative or connotative, in that the abstraction works with or at least supposes a generalization involving many objects with similar or identical parts or properties. This is the case in the abstractions made in a study of chemical or physical properties, for many objects are compared and subjected to classifications according to specific heats, electro-motive constants, solubilities, etc. In chemical analysis, however, we are not, of course, analyzing one molecule at a time.

The first result of an analysis in chemistry is a statement that in a given mass of material there was, by weight, a certain ratio of different elements. Taking these ratios and correlating them with the specific (atomic) weight of the several elements, we reach a conclusion that in a single molecule there are so many atoms of this and so many atoms of that. But again, we are dealing only with generalizations, for we ^sassume the complete homogeneity of the sample and the

qualitative identity of all the molecules. Or if we are too critical to make these assumptions, we state that the formula given expresses the composition of "the average molecule" in the given material.

Third, a modicum of synthesis is involved in every chemical analysis. The example above illustrates this; for even the free form of an element, with which we ended, is not atomic (except in a few peculiar cases), for atomic forms have such a valence that if no other element or compound is present they synthesize themselves into molecules of elements. Where this is not the case, as in the inactive elements, of course, there has been no analysis in this sense taking place. In extracting the noble gases from the atmosphere, for example, we are extracting, but the process is not formally like the types of chemical "analysis" discussed here. In these cases, analytic synthesis is absent, except in trivial senses.

C. Description

15. It is necessary now to survey briefly the ground we have traversed and to point out some relationships which may not be immediately apparent.

Abstraction is restricted to the separation in conception of what is not actually separated in presentation; but its division into connotative and denotative depends upon the

impossibility or the possibility, respectively, of a separate presentation of the element abstracted as a substantive.

If the separation in presentation is made, the procedure is an empirical abstraction or an extraction. The results of this may be used as clues to the nature of the material on which the process is performed, and in this case extraction is regarded as a step in a process of analysis.

Now a description of an object is a verbal or symbolic representation or communication of its features. The object as a complex unity is subjected to a process of abstraction of its parts and properties which are then "translated" one by one into words, and these words are then ordered in a certain way so that certain adjectives and prepositions go with certain nouns; in this way a nomothetic determination of the object as a single is possible. This determination is called a description, and it leads us to recognize an object which has been described or nomothetically determined.

But description may involve more than this report of an acquaintance, in which the subject is relatively passive, that is, in which he does nothing to the object which he is describing. It may be a report of the nature and character of the process, perhaps instigated and controlled by the subject in an experiment, by which this object becomes other; in a word, the report of a process of analysis may be part of a description.

A description may vary in nature in many ways, depending upon the object and the purposes of the communication. The most abstract form of description, regarded from the standpoint of amount of information communicated, is one which takes the genera and species of objects in such universality as to constitute definitions of the objects or concepts.

Previously we have considered analysis as a process or procedure; but it may be considered in a somewhat different context, namely as an achievement. Analysis as an achievement, rather than a process (though a sharp dichotomy is not possible) is a form of description which represents the (ultimate) constituents and their relationships in a complex object or concept. Analysis as an achievement has recourse to such fundamentals that, including terms and relations from abstracting procedures and inferring from the process of an analysis to what may lie at the ground of the observed changes in the decomposed object, it attempts to give a complete and systematic knowledge of a complex object.

In an analysis we are not generally content to remain at the level of mere phenomenology, but we include reference to such universal principles that our description attains to the level of orderliness and ultimacy characteristic of what may be called explanation. When one gives an analysis of a curve in geometry, he does not describe the way the curve looks or behaves so much as he finds some equation which gives the "reason why" it behaves in the way it does.

No sharp line can be drawn between description and analysis of this kind and explanation, however; but what is essential is that analysis has reference to parts and relations, and to claim that it deals with more than these (e.g. with emergent properties) is to fail to draw any distinction between ^edescription as an achievement and analysis as an achievement, or indeed between abstraction as procedure and analysis as procedure. We shall have occasion in the following section to see the dangers in this confusion.

D. Analysis as Achievement

16. Analysis must be regarded under two aspects - first as a procedure and second as an achievement. It must be seen as method and as result. Here, as elsewhere in methodology, though, no very sharp lines of division can be drawn; abstraction fades into analysis as a method, or again it seems one phase of description; then description is seen to be similar to analysis as an achievement, and finally it can be shown that all these methods involve similar synthetical and syngnotical procedures.

But the distinction between procedure and result is a very useful one. We can suppose that analysis as previously characterized and abstraction are capable of giving knowledge of some of the parts and relations which constitute

things, but no one of these processes gives us a complete knowledge of the components and their organization into a whole. Many of these steps must be taken, and it is the integrated result of these which is the achievement of analysis. Thus it is these results and the general methods of their organization and interpretation which now call for critical attention. ¹

17. Two types of analytic achievement can be distinguished, and these we shall call formal and empirical analysis. The former may occur in a pure form without the latter, but the latter is never without some basis in the former, just because description of a process of abstraction or analysis involves terms and rules elucidated in formal analysis.

Formal analysis is an expression of the relation of parts ^{and} to wholes/to each other in merely a logical, inferential sense. That is to say, within the schema of logical or syntactical rules, movement is made from intensional wholes to intensional parts; and this procedure is non-empirical, a priori within

¹ Attention should be called to an article by A. J. Harris, "Analysis: A Contribution to Psychological Method", Psychol. Review, 36, 1929, pp. 1-12. By giving an unsatisfactory definition of analysis as the consideration of anything in detail he is led to the recognition of five types of analysis in psychology: deductive, meaningful, aspective, constitutive, and relational. The first corresponds to our formal analysis as achievement, the second to empirical analysis as achievement, the third to our perspectival synopsis, the fourth to empirical analysis as procedure, and the last apparently to our constructive synopsis. My distinction between process and achievement was suggested by Spearman, The Nature of 'Intelligence' and the Principles of Cognition, p. 140; but he does not develop the notion at all.

... of the components and their organization into a ... of these steps must be taken, and it is the ... of these which is the chief merit of ... that it is these results and the general methods ... and into a presentation which now calls ...

IV. The types of analytic solutions ... can be distinguished ... the latter may occur in a pure form without the latter, but ... is never without some basis in the former, just as ... of a process of abstraction or analysis ... rules of analysis in formal analysis ... is an expression of the relation of parts ... each other in terms of logical, inferential, and ... within the scheme of logical or syntactical ... is made from intensional wholes to intensional ... this procedure is non-empirical, a priori with

attention should be called to an article by A. A. Harnik ... to a distinction to a methodological method ... giving an unambiguous ... of analysis in detail ... the necessary types of analysis in ... deductive, inductive, abductive, conservative ... corresponds to our formal analysis ... the second to empirical analysis as an ... to our analytical synthesis, the fourth to ... analysis as procedure, and the last apparently to ... by distinction between process and ... was suggested by Beerbaum. The ... and the ... of ...

the logical region explicitly defined by the rules of the logical language. Formal analysis is sometimes called "philosophical", as by Schlick, in the following passage:

Das Wesen der philosophischen Analyse (im Gegensatz zur wissenschaftlichen Forschung) besteht nämlich darin, dass sie nicht unmittelbar Wirklichkeitserkenntnis liefert, nicht die Tatsachen selbst ausdrückt, sondern sich darüber klar zu werden sucht, auf welche Weise wir denn die Tatsachen ausdrücken. (Und diese Klarheit bildet die Vorbedingung dafür, dass man die Tatsachen richtig ausdrücken kann.) Mit anderen Worten: Sie stellt Sinnfragen, während die Wissenschaft sich auf Tatsachenfragen richtet. Die meisten Unklarheiten und Scheinprobleme entstehen dadurch, dass man beides verwechselt, dass man für eine Sachfrage hält, was eine Frage des Ausdrucks, der logischen Grammatik ist.

In analysis which is supposed to be purely formal, we are not speaking of truth or of realities, but of forms of validity, i.e. of types of possibility. Thus Nagel writes,

In philosophical analysis, as distinct from other kinds, we pass from one level of abstraction to a level at least one degree lower, * aiming finally at reference to bare particulars and the explicit mode of their configuration. Philosophical analysis therefore has a direction; its intent is

² Moritz Schlick, "Das Problem der Ganzheit", Bericht u. die. I. Vorkongress f. Einheit d. Wissenschaft, p. 55.

* "Lower" in this statement, I believe, must be interpreted in Whitehead's sense of "lower in the scale of abstraction from possibility", and this is equivalent to higher in the scale of "abstraction from actuality", the common sense scale of abstractness.

to reveal the structure of facts expressed by sentences referring to them indirectly, by exhibiting directly their component elements and their interrelations. It is, consequently, an acknowledged presupposition of the whole procedure that there should be 'basic' or ultimate facts, i.e. facts which are absolutely specific and simple, not containing any elements which are themselves complexes of other elements. ³

Philosophical analysis, with a somewhat different purpose, it must be admitted, had its origin in mathematics, and one of its best expressions in the history of philosophy in the writings of Descartes. ⁴ Descartes wrote, "Analysis shows the true way by which a thing was methodically discovered or derived, as it were from effect to cause, so that, if the reader care to follow it and give sufficient attention to anything, he understands the matter no less perfectly and makes

³ Ernest Nagel, "Impressions and Appraisals of Analytic Philosophy in Europe", Jour. of Phil., 33, 1938, p. 13.

⁴ As a mathematical method, of course, mathematics is much older. Pappus, Synagoge, bk. vii: "Analysis, then, takes that which is sought as if it were admitted and passes through its various consequences to something which is admitted as a result of synthesis." (Ency. Brit., 14th ed., vol. 1, p. 865.) Cf. "Analysis" in G. J. Robertson's Philosophical Remains, (London, 1894), pp. 82-83. Also: F. v. Cornford, "Mathematics and Dialectic in Republic, vi-vii", ibid., n.s. 41, pp. 43-47 (n.v.) and a full criticism by Richard Robinson, "Analysis in Greek Geometry", ibid., 45, 464-473. The "reciprocity" between analytic and synthetic methods demanded to prevent the fallacy of affirming the consequent indicates a kind of synoptic guide. A logical complex is given and analyzed, and from the analytically found elements the whole must be synthesized, and the elements must have some claim to reality other than their discovery in this analysis. Psychologically, the convergence of axioms to a particular whole (theorem) is determined by the analysis of the whole.

it as much his own as if he had discovered it." ⁵ Kant is perhaps quite right in criticising the name of this method, though it does fall under the name analysis as understood now, though not under Kant's use of the term. He says, "The analytical method, so far as it is opposed to the synthetic, is very different from that which constitutes the essence of the analytic propositions: it signifies only that we start from what is sought, as if it were given, and ascend to the necessary conditions under which it is possible. In this method we often use nothing but synthetic propositions, as in mathematical analysis, and it were better to term in the regressive method, in contradistinction to the syntactic or progressive." ⁶ As best illustrations of these methods in philosophy, one might point to some works such as Descartes' meditations and Kant's Prolegomena as examples of the use of analytical method; and Kant in the first critique and Spinoza in the Ethics use the synthetic or progressive method.

There are three features of formal analysis which must be emphasized in conclusion. (1) The analysis of a logical whole into its parts (e.g. a theorem into its component terms, relations, and their syntactical connections) creates no

⁵ The Philosophical Works of Descartes (2 vols. Cambridge, 1812), vol. II, p. 48.

⁶ Prolegomena to Any Future Metaphysic ..., sect. 5.

It is not the case that the method is not discovered in Kant's

methodology, but that it is discovered in the name of this

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presumption as to the validity of the whole unless it is possible to reverse the process of analysis and derive the whole from the parts. To assert the validity of the whole on the basis of the validity of its analytically discovered conditions is to commit the fallacy of affirming the consequent.

(2) If, however, we were given only the elements we should have no guide for their integration and connection that is necessary for their convergence towards a proof or the construction of a logical complex. That is to say, a theorem in Euclid may contain all the axioms and definitions, but if only the axioms and the definitions were given, the generation of complex theorems in geometry would be without the directness which is present when synthesis can merely reverse the direction of inference towards that which the analytical procedure began with, "assuming what was to be proved as though it were true."

(3) In formal analysis we are not dealing with empirical facts, but with their forms of configurations as these appear in the language which is to express them validly. Thus in the purest type of formal analysis as this is found in logical syntax, the terms are not empirically indicable, but are variables having an intensional meaning only so far as this is determined by the syntactical relations they enter. That is, their meaning is a relational essence only. The

purest formal analysis, then, is concerned with formal systems, and formal systems we have found to be synoptical wholes of a regulative type when seen in relation (as they must be) to their parts. Analysis and synthesis appear as phases of a regulative, constructive synopsis.

18. If we consider analysis still as an achievement, even when we point to objects in an empirical analysis we are referring to a set of propositions and judgments, not to a set of changing chemical indicators or to a dissected corpse. As a set of propositions and judgments it will be like a formal analysis, of course, but here no longer are we analyzing "languages" or arguments, but we are referring to objects, a reference which Schlick has warned against in formal analysis.

Yet when one leaves formal analysis and goes into empirical analysis, he does not, or at least he should not, leave the model of formal presentation behind. In a word, if we are going to mean anything at all distinctive by analysis, different from the achievement of a description, the distinctiveness must be found in the type of data which are symbolized in the achievement of an analysis. That one does not mean precisely the same by an analysis and a description is obvious; but what differences there are between them are not so obvious. There are several points of variance, though none of them make a sharp line of demarcation possible. These differences relate

to the fact that analysis is a more "rigorous" presentation than description, and as a consequence the achievement of an analysis is ordered in such a way to a larger body of information that the facts stated in an analysis have an explanatory value not to be found in mere description. Let us take, for example, a novel. A description of the novel will perhaps relate the story, tell how, when, and by whom it was written; but an analysis will be a statement of the inner nature of what the description presents: this climax results from this feature of character A and that from event B, etc. As a result of analysis we have what may rightly be called an explanation instead of a description, because we have left the surface of the events and, by relating them to more fundamental principles and types of events (abstractions, aesthetic laws, etc.) , we can show why, certain things being given, the story is as it is, for in a good novel the events follow inevitably from character and from one another. Our analysis is a statement of the logical genesis of the parts from the conceptions of the whole and of each other. Another difference is to be found in the fact that description has no special concern with parts and their relations unless these are immediately given; but analysis, which, as a process concerned with parts in their relations, is as an achievement concerned with the orderly presentation of constituents. Here again, however, there is perhaps only a difference of degree of

"fundamentality" of the two achievements; description can give a report of a process of extraction and decomposition, but for extraction to be significant for our knowledge of the substance which has been decomposed, the data or facts of extraction must be interpreted as the necessary products of just this and no other structure and composition.

19. In analyses which are to be of use to science, the analytic achievement must be expressed in terms having a general validity in science so that it may be possible to attribute such universality to the expression that it will have predictive value. Instead of a merely logical (i.e. merely according to the laws of logic or a language) movement from one level of abstraction to another, as in formal analysis, what is a desideratum in science is that the analytical direction shall be determined by the empirical laws and principles of the particular science, having reference to objects. In this, if we wish to call the realm of discourse a "language", the rules of the language are developed along with the discovery of its vocabulary, as it were. Thus in analysis we try to move towards general laws, laws which frequently have in them no reference immediately apparent to the empirical data from which they may have been discovered and for which they are specified and finally substituted. The most useful analyses for science are not those which are phenotypic but

those which are genotypic; and here again we meet a difference between analysis and description. A description, properly speaking, is always phenotypic, while analyses are, at their best, genotypic, going to the "invisible insides" of things, even if the alleged "invisible insides" are mere fictions.

It is quite usual to distinguish between knowledge by acquaintance and knowledge by description. At every stage of the procedure of abstraction, analysis, and description there is acquaintance or direct awareness, and often synopsis; thus direct awareness of some kind gives the data on which these methods are exercised, and synopsis guides the organization of abstractions into descriptions. The discursive nature of the results of these procedures makes these results knowledge by description, but in their role as procedures giving empirical material for the orderly presentation in results, they are analogous to knowledge by acquaintance of the object. The procedure is acquaintance-like, the achievement is description-like. This is expressed by saying that the procedures and their description are phenotypic, while analysis expresses genotypes. In the latter case, too, there is to be seen the guiding hand of synopsis which gives direction to the analytic synthesis which the data, or the facts of the analytic processes undergo when they are interpreted in interrelationships which are not likewise simple data.

20. Several times in the course of this chapter it has been

necessary to make use of a term suggested by Paulhan, namely, "analytic synthesis". By analytic synthesis is meant the elementary reconstruction of any distinguished part into a synthetical structure. Such analytical syntheses are essential because a complete isolation of a distinguished element or part is impossible. We have seen previously how this is impossible in abstraction; a standpoint of abstraction is the prius of a process of abstraction, and the property of an object abstracted must be subsumed under an idea of a property or in a larger whole. In formal abstraction, a property such as particular color is abstracted from a complex of objects; but this property does not remain alone, for in losing sensory immediacy it must be put under a more abstract universal and perhaps defined by being given a place in a color system.

In analytical procedures, such as the decomposition of a chemical compound, usually the products of the extraction are not elements, but parts of other compounds. Thus in the analysis of a compound A, its parts a and a' are generally not produced in an isolated form, but as parts of other compounds B and C.

In analysis as an achievement, judgments made concerning the nature of a whole can be seen to be both analytical and synthetical. Bradley's example is that the analytic operation of A shows it to be b,c,d. But since the separateness and

inner distinction among b, c, and d was not explicit in A, the analytical process is expressed synthetically. In synthesis, on the other hand, we move from the relationality of the parts severally to the suppression of separateness and the assertion of the integrity of the whole; we move from AB and BC to AC, and if r is transitive, the synthesis is expressed in an analytical judgment. "Analysis is the synthesis of the whole which it divides, and synthesis is the analysis of the whole which it constructs."⁷ "A judgment which is analytical in form may be synthetic in effect, when one side of the identity expresses an analysis of what is represented on the other side without analysis (or through a different analysis)."⁸

This synthetical incorporation into judgment is generally characteristic of analysis as an achievement, and where it does not obtain, we suppose that we have come to a natural limit of analysis. The assertion of an analytic synthesis in terms of significant synthetical propositions which are analytic within the wider context of the categories of the analysis, is characteristic of analysis, but not of description.

The usual form of analytic synthesis, as it appears in

⁷ F. H. Bradley, The Principles of Logic (2nd ed., revised and corrected, London and Oxford, 1938), vol. ii, pp. 470-471.

⁸ H. K. Eaton, Symbolism and Truth, p. 128.

from the fact that the whole is not the sum of its parts.

The logical process is expressed synthetically. In contrast to the other hand, we move from the relationship

of the whole to the expression of its parts and we move from

the analysis of the totality of the whole; we move from

the whole to the parts, and if x is transitive, the synthesis is

the whole which is divided, and synthesis is the

analysis of the whole which is composed. A judgment

is synthetic in that it may be synthetic in effect, when

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form of analysis synthetic, as it appears in

analysis as an achievement, is the construction of a generalized relationship. In the presentation of results, the nomothetic generality of terms gives at least a formal universality of relationships which are asserted. The attempt of the scientist is to move from particular empirically determined functionally expressed relations between particular empirical data to a generalized relationship between types of events. As a consequence, the further analysis is advanced, the further it moves away from mere description, which is confined to the phenotypically given particulars, the analytic synthesis of which is into merely abstract universals which express no functional complexity in the object.

41. This organization of data in an achievement of an explanation or understanding of a thing is also a "constructive synopsis" of its empirical parts or "elements" discovered in the process of analysis; they are no fully seen in their role as parts. "Der Sinn der Teile liegt im Ganzen." Practicing scientists as well as methodologists have recognized this. Poincaré, for example, wrote,

A mathematical demonstration is not a simple juxtaposition of syllogisms, it is syllogisms placed in a certain order, and the order in which these elements are placed is much more important than the elements themselves. If I have the feeling, the intuition, so to speak, of this order, so as to perceive at a glance the reasoning as a whole, I need no longer fear lest I forget one of the elements, for each of them will take its allotted place in the array, and that without effort on my part.

.....

Now, what are the mathematical entities to which we attribute the character of beauty and elegance, and which are capable of developing in us a sort of aesthetic emotion? They are those whole elements which are harmoniously disposed to that the mind without effort can embrace their totality while realizing the details. This harmony is at once a satisfaction of our aesthetic needs and an aid to the mind, sustaining and guiding. At the same time, in putting under our eyes a well ordered whole, it makes us able to foresee a mathematical law.

In biology, Kurt Golstein writes:

Wir leugnen dass die Möglichkeit besteht, biologisches Erkenntnis allein auf Grund der mit dem analytischen Methoden feststellbaren Erscheinungen gewinnen zu können. Damit verkennen wir die Bedeutung dieser Erscheinungen keineswegs. Wir nehmen sie nur nicht so ohne weiteres als Vorgänge des Organismus hin. Sie haben sich erst in ihrer 'Bedeutung' für das Geschehen im Organismus zu erwiesen. Sie sind zwar das Material, von dem wir ausgehen müssen, sie erfahren aber ihre Bewertung erst durch das Bild des Organismus selbst.

.....

Das Bild das wir uns von Organismus machen, ist

⁹ Henri Poincaré, "Science and Method", in The Foundations of Science, pp. 385, 391-392. Cf. Adolph Meyer, "Die Idee des Holismus", Scientia, 43, p. 26, for a similar statement from Hilbert. I may say that, with one exception, I have never found any essential disagreement concerning the role of this intuition in mathematics. The one exception is C. R. Morris's Idealistic Logic, pp. 300 ff., who, in emphasizing the incorrigibility of mathematical judgments gives mathematics, it seems to me, a serial or linear rather than synoptic structure. But this writer does not consider in any detail the procedure of proof, and as a consequence mathematical judgments seem to be endowed by him with a specious independence from the system which alone makes them possible.

keine Synthese aus den gewonnenen Einzelerscheinungen. ... wir können zu diesem Bilde nur durch einen schöpferischen Akt gelangen.¹⁰

Schelling, who according to Merz¹¹ was the most synoptic of the transcendentalists, wrote:

Es gibt nur wenige Merkmale, aus welchen in Wissenschaften sich auf Genie schliessen lässt. Es ist, z. B., sicherlich da nicht, wo ein Ganzes, dergleichen ein System ist, theilweise und gleichsam durch Zusammensetzung, entsteht. Man müsste also umgekehrt Genie da voraussetzen, wo offenbar die Idee des Ganzen den einzelnen Theilen vorangegangen ist. Denn da die Idee des Ganzen doch nicht deutlich werden kann, als dadurch, dass sie in den einzelnen Theilen sich entwickelt und doch hinwiederum die einzelnen Theile nur durch die Idee des Ganzen möglich ist, so scheint hier ein Widerspruch zu seyn, der nur durch einen Akt des Genies, d. h. durch ein unerwartetes Zusammentreffen der bewussten mit der bewussten Thätigkeit, möglich ist.¹²

22. Analysis is sometimes claimed to be the only adequate method of knowing, but we are seldom told what constitutes

¹⁰ Kust Goldstein, Der Aufbau des Organismus (Haag, 1934), pp. 241, 242. Some of the most interesting expressions of this are to be found in Goethe's writings. See particularly the introduction to Die Metamorphose des Pflanzen, Geschichte meines botanischen Stadiums, and Der Versuch als Vermittler von Objekt und Subjekt.

¹¹ J. T. Merz, History of European Thought, iii, 350, 465.

¹² System des transzendentalen Idealismus, 623-624. This must be understood in reference to Kant's denial that genius is possible in science. Critique of Judgment, sects. 46-50.

... wir können an diesem Bild ... durch einen schöpferischen Akt gelangen.

... was the most ... according to Marx ...

... die Idee des Ganzen ... die Idee des Teils ... die Idee des Ganzen ...

... is sometimes claimed to be the only ...

Kurt Goldstein, Der Aufbau des ... (Henz, 1934) ...

... in ...

... in ...

the adequacy of knowledge. Here it is not intended to minimize the value or deny the validity of analysis as a procedure or achievement, but it is necessary to examine the claims to the self-sufficiency for the procedures and accomplishments called analytic. First let us note two points which are relevant, but which have already been brought out.

(1) Analysis and abstraction presuppose a standpoint or a purpose from which they are made; they are not ends in themselves, and we aim to know objects by abstraction and analysis instead of knowing abstractions and analysands. Thus the point to which we try to push them is not determined by the processes themselves, but pragmatically, by the purposes to which we wish to put our knowledge. We cannot say a priori how far our analysis can go. ¹³ We carry it as far as we can at any time, and we use the most elementary terms as "elements" or simplices; but the progress of science has often shown that what is an element for one generation is a problem for the next to analyse. More immediately important, however, is the fact that simplicity is generally to be understood only in some relation or purposeful context which at least implicitly determines the criterion of simplicity. Thus for sociology a person is an element, or rather a simplex, though

¹³ Actually there is a limit beyond which we do not go, namely, the point at which all propositions become analytic in effect. Cf. p. 211.

for psychology he is a complex whole. A sensation is simple for psychologists using one set of categories (Titchener) but it is complex for others with other purposes and categories (Münsterberg). The pragmatic limit, depending upon the needs and presuppositions of knowledge in any sphere, has been stated in the following striking form: "The principle divide et impera is of limited validity; men may be ruled by dividing them into factions, but if you divide them into limbs and organs there will be no men to rule." 14

The analytic knowledge of a whole, though, when considered quite generally, follows the "allgemeines Gesetz, dass die Klarheit eines umfassenderen Ganzen, eines Ganzen höherer Stufe keineswegs der Klärung der eingefügten niederen Ganzheiten notwendig bedarf. In der Regel gibt allerdings die nächstniedere Stufe noch entscheidende Aufklärung." 15

(2) Analysis and abstraction begin with an acquaintance or a synopsis of a whole, and description and analysis as an achievement owe their organization to a synopsis which guides the analytical synthesis, the reconstitution of this whole in symbolism.

23. "A Defense of Analysis" by Professor Edward Gleason

14 A. F. Hallett, Aeternitas, p. 195.

15 Wilhelm Burkamp, Die Struktur der Ganzheiten, p. 141.

Spaulding, in the collective work, The New Realism, is a detailed study and defense of the sole validity of analytic procedure and achievement. An examination of Professor Spaulding's paper will furnish, however, further evidence of some limitations and inadequacies of analysis.

In moving from a whole to its parts and their relations, the emergent properties of a whole are lost; they may be included in a description of the whole object, but just as they are lost in the empirical process of analysis, so also are they lost to an achievement of analysis which moves to parts and relations and away from sensuous acquaintance or its report in a simple description using the data of abstraction. But, Spaulding writes, "Consider both terms and relations and the properties of the whole which may be left over, but which are revealed by analysis, and the analysis becomes adequate" (p. 168.)

One can rightly object that while Spaulding was giving his many definitions, he failed to define either analysis or adequacy; in regard to the first, he says only that "An exact and precise logical definition may not be necessary. Everyone understands in a general way what analysis is, what it means, and what it does." (p. 157.) And he does say that by analysis (American) realists understand "the discovery in a whole of elements which exist or subsist independently of analysis and discovery." (p. 159) I am not sure that

one can share Professor Spaulding's optimism that "everyone understands ... what it means," "seeing already that there are such differences in his and my understanding of it. What does analysis mean for him? Obviously it means nothing more nor less than complete description; it is not reference to parts alone, nor in their relations (his "and" is particularly ill-advised), but also to emergent properties of the whole which are not known in any analytic procedure at all, but only in acquaintance. In so far as analysis is description, no objection is being made to it. But Spaulding's defense of its adequacy, if analysis is other than mere description, as I have urged, takes the following simple form: a whole is analyzed into its parts in (or and) their relations, and the discrepancy between this achievement of an analysis and a description of the unanalyzed whole (this discrepancy being equal to the emergent property) is noted and added on to the strictly analytic result to reconstitute a complete description of the whole and its parts. In short, he says that an analytic procedure becomes adequate when that which it does not produce is added to it as a kind of prerequisite. The inadequacy of the analytical procedure or achievement is recognized only on the basis of a comparison of a synopsis or an acquaintance with the original unanalyzed whole (acquaintance for an emergent property, a synopsis for the "organizing relation" -- p. 163) with the achievement of

the analysis. The oversummative properties and relations are not discovered in a process of analysis but are "stolen" from description by Spaulding's statement. It is necessary to ask, according to the one "definition" he does give, whether an emergent property of a whole and its organization are themselves parts or elements of the whole. If they are not, as seems reasonable, then his analysis as defined fails on his own admission (cf. p. 162) to be adequate. If one risks the affirmative answer, then an "organizing relation" as a part of an organized whole among other parts must be organized into the whole by an "organizing relation", and this by another, ad infinitum. Therefore it must be denied that organization is a part of the organized whole, and therefore analysis as Spaulding defines it (p. 159) does not give knowledge of it. Thus it is inadequate to a full knowledge of the object.

It has been generally recognized that a process of empirical analysis sometimes is a cause of actual qualitative changes in the parts. Two theories are suggested by Spaulding to account for this: when parts are analyzed out, their properties are changed, or the parts remain the same in and out of combination, but in union new properties accrue to the whole. (pp. 241-242) From Perry's alleged proof of the independence of part from whole it seems likely that the American neo-realists would favor the latter as a metaphysical view, but Spaulding

says that analysis is capable of handling the differences regardless of what metaphysical view is taken. Thus he writes:

At each stage in the synthesis of wholes out of parts which are in turn wholes until we get to the intensity points of that field of force which is the electron, there are properties of the whole which are not found in the properties of the parts. But analysis reveals what these wholes are, what their parts are, what the properties of each are, and what the organizing relations at each level are. It allows for a whole which is not merely the sum of its parts, and which, with its properties, cannot at the present stage of science be deduced from these parts.¹⁶

More particularly in reference to time he says:

The terms by themselves [instants] seem to be the contradictory of the originally given whole. But actually they are terms in a certain relation. As terms in this relation, they present no contradiction with the properties of the whole. In fact, only through them as terms in relation is the whole what it is -- continuous, infinite, extended -- unless these attributes be left wholly vague and undefined. ... There is no characteristic of the empirically given whole over and above what these terms in relation are.¹⁷

The neo-realistic theory of relations based on Russell's "logical atomism" must hold that simple terms (terms with

¹⁶ Op. cit., p. 239. The last clause indicates that this is supposed to be empirical rather than formal analysis.

¹⁷ Ibid., pp. 192-193. Here he seems to be confused as to what sort of analysis it is. He talks as though it were empirical analysis of something given (the empirically given whole, as he calls time) but he is concerned with the properties of abstract mathematical or physical time, not time as it is given empirically, for it is not infinite and not continuous in the sense that he defines continuity.

no internal complexity) are possible, and if analysis is complete and valid, it must be the resolution of "logical compounds" into logical atoms. It is just this, though, that Spaulding's analysis does not do if it does the other things he claims it can. If parts have properties which elements do not have, as is at least phenomenally true, then the analysis which discovers that which exists independently of discovery (p. 159) cannot discover elements, but only parts which owe some of their qualitative nature to the wholes of which they are parts. The parts which are different when they are members of a whole from what they are when not in the whole (i.e. elements) have an inner complexity as in-
trinsically single things, depending in part for their particular nature on the whole. 18

An internal relation, one that "makes a difference" to its terms, 19 implies an internal complexity in at least one of its terms, the one it is said to be internal to. 20 This being the case, "the relation of part to whole makes a difference to the part" implies, as pointed out in our discussion of Perry, that the relation of part to whole is internal (at least to part). 21 This, in turn, implies that "part is

18 Cf. above, p. 148.

19 Moore, Philosophical Studies, p. 281

20 Russell, Principles of Mathematics, i, ch. xvi.

21 "The relation of part to whole makes a difference to part" means simply that an element is different from a part.

not simple but has internal complexity", which implies that the analysis has not been complete, that is, that it has not led to logical or cosmological atoms. The internal complexity of the end-product of analysis, which is the metaphysical presupposition, then, implicit in Spaulding's statement that the parts must be considered in their relations, prevents the validity of the assertion of the completeness of analysis, i.e. that it reaches absolutely simple constituents which are theoretically amenable to no further analysis. 22

A simple statement of this rather technical objection is parallel to the former objection that analysis is not able legitimately to deal with the qualitative features of the whole; here it is seen that the qualitative difference between an entity as an element and as a part is a problem which Spaulding's study does not solve. This parallelism is most clearly seen in his own analysis of time and space. At the end of his analysis he has no way of distinguishing between a "point of space" and an "instant of time". He simply makes

22 If the reader refers to the previous discussion of Perry, he will see that this argument is not altogether universal, any more than the view it sets out to refute. On p. 148 I pointed out that in any argument concerning the internality of the part-whole relation it is necessary actually to see if the relation does "make a difference" to the part. It would be as wrong for me to assert, on the basis of my argument, that all parts depend, in Perry's language, on the whole as I have shown it to be for him to assert that none of them are dependent.

the whole do service in interpreting the qualitative nature of the part; he simply says that the one has something "spatial" about it, and that the other is "temporal". Yet it is just spatiality and temporality which he is supposed to be analyzing. (Cf. pp. 188, 190.)

24. A closing word should be said about the evaluation to be made of analysis. If by analysis we mean Spaulding's form of it, we can say that analysis is the expression of a mediate synopsis, a cognition that parts are related to a whole. But in so far as analysis is descriptive, or a common discursive process, the element of sensory immediacy is lost, so that analysis must be supplemented by acquaintance.

Synopses, on the other hand, have a discursive form only implicit in them, and the expression of synopsis must take the form of expression appropriated by analysis, i.e. symbolism or knowledge about. This descriptive moment in synopsis, which corresponds to the "syn-", expresses the relational complexity of the object in synopsis; and it is the "syn-" moment of synopsis which, when symbolized, is symbolized in the same way an analysis is expressed.

In so far as the mediate, constructive, and perspectival synopses have in them a formal structure which makes propositional expression possible, and in so far as the synoptic functions themselves are nothing more than normal cognition

with an accent on complexity in unity as sensuously presented, one can say that formal analysis and empirical analysis and description presuppose a synopsis of some kind (often an immediate synopsis), and synopsis is an incomplete form of knowledge if it does not have formal analytic structure so that it may be communicable. The systematic, structural element ("syn-") in synopsis may be called the symbolical or the "symbolizable", and with reference to the fact that systematic ideals are often called analytic, with some propriety it might be called the analytical moment in synopsis. These concessions of the synoptist to the analyst, however, must not blind us to the fact that systems, themselves, as shown in our studies in chapter II, are subject to a synopsis in which both they and their parts are put in their proper internal relations and seen as wholes in which the inference is not uni-directional.

E. Synthesis in Knowledge

25. In the foregoing section it has often been necessary to mention synthesis as a process correlative, in some ways opposite, but also complementary, to analytic procedures. As a moment in the process of abstraction and analysis, whether empirical or formal, it was seen that no element taken out of a complex is placed in either conceptual isolation or cosmological isolation; the logical term abstracted becomes synthesized in a universal, and an organ removed from

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E. Synthetic Knowledge

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 ...is present in either sense; that isolation of
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 ...in a universal, and an organ removed from

a living body is by that fact placed in a new environment. The process of analytical synthesis, as it has been called, is an expression of the fact that meaningful propositions are both analytical and synthetic, for the process of analysis of the subject to discover the explicative predicate always refers beyond the expressed to the general principles of its intensions and meaning which have their being not solely or originally in the expressed logical subject as an abstract universal or proper name.

Similarly, synthesis has been indicated as the inverse process to analysis in argument. Descartes used the term for the process of deriving what we know from the assumptions which make it possible, whereas analysis starts with what is given and reflects the actual process of discovery of its necessary conditions. Thus Euclid used synthetic judgment. Descartes said that ancient geometry had been synthetic; though this is generally true of its manner of presentation, it must be admitted that the reductio ad absurdum is an analytical argument -- and, moreover, an analytical argument which is valid without the necessity for a subsequent synthesis or even for the "reciprocity" or symmetry of the argument, as is the case in other forms of analytical argument.

Furthermore, synthesis as an empirical process has been touched upon; if an achievement of analysis shows these parts in these relations, it should be possible to take

these parts and put them in these relations and thus reproduce the original whole; a comparison of the unanalyzed starting-point or raw stuff with the fabricated, synthesized product gives a criterion of the correctness of the process of analysis, providing we can be sure that the synthesis has reproduced, in reverse order, the steps of the analysis. This comparison is of utmost importance in chemistry, for example, for had the process of synthesis always resulted in the same products as those which were decomposed, we should have supposed either that only one set of relations for each set of elements was possible, or that the relations were irrelevant to the nature of the compound. It is due to the fact that it is only under very carefully controlled conditions that a synthesis reproduces a raw product that organic chemists were made to lay more emphasis on constitution than on composition. Actually it is quite easy to make sure that nothing goes into a compound except what was got out of it; but it is very difficult to preserve the relationships among the components. As previously pointed out, it is only because of the existence of radicals which preserve their internal organization and composition in the most varied chemical changes that it is possible at all; and these radicals can built up into compounds whose structures are easily inferred

by analogy to simpler radicle-systems. The relationships can be fixed in a compound which is being synthesized by building it up from stable chemical compounds which have features of their structure like the structure we suppose the desired compound to have. The chemist is like the mason who uses large stones instead of small tiles in his building, for he builds with radicles that "stick together" instead of with their constituent atoms.

The analysis of organic compounds is generally proximate, rather than ultimate, for from the elements we can tell next to nothing about the nature of the compound as a whole; and the limit of analysis is here determined by the unability of the parts for synthesis. A complicated chemical compound can be broken into two or a few chemical compounds whose stable structure we have learned in a long series of other proximate analyses into compounds which are so simple that perhaps they have only one possible structure; and from these series of analyses we can infer the necessary conditions for a synthesis.

36. "Constructive synopsis" designates the knowledge in which an object is comprehended conceptually or actually subordinated to a larger, more inclusive whole which unifies it with others as parts of a system or another complex object. We have already considered the relation of a single element,

say a formula, to a whole, such as a scientific language or system; and complex systems with mutual dependence of part on part have been discussed both as objects of synopsis (as a scholar may have a synopsis of Kant's philosophy), and as the form in which a set of facts reach their fullest rational development (as in a mathematical system or in a system of philosophy). But how are these complex objects and sets of representations acquired in knowledge? The answer is, through a process of synthesis. Synthesis does not mean the having of a whole in experience (this is synopsis) but a movement of knowledge from an unorganized heterogeneity of judgments to that which comprehends them, or the actual process of the empirical establishment of an objective unity having such an extensional content. The former is illustrated in the construction of a philosophical system which compresses and integrates many distinct or discrete particular facts, judgments, preferences, and biases; the latter in the construction of an object such as a picture. ¹

37. Either of these cases is an example of a creation, whether it be the planning of a drama or the finding of a missing premise in an entymeme. Creations are of the nature of problem-solving, and the problem to be solved and supposed

¹ Wilhelm Burkamp, Die Struktur der Ganzheiten, pp. 12-13.

as solved is the ideal of the creation. "...The ideal is the construction in images that should become a reality."² In the origination of and the initiative derived from the ideal, the mind is acting synoptically; synthetic moves from the whole it has to the whole which comprehends it, reduces it to order, makes it intelligible; it involves the correction, distortion, and supplementation of the given mass to make it fulfil its role in the new whole.

This ideal, this construction in images, gives creations their organic character; without it the changes in the given content would be haphazard, without direction, and disintegrative. Just as a man needs some purpose in life in order to govern his acts effectively, and to keep them from being random, so also his thinking on a problem requires a hypothesis, generated in his present knowledge but, as imagination, extending far beyond it. The creations of imagination must be subjected to criticism, though: Does this hypothesis explain the facts I now have? If this hypothesis is true, then that will occur if I do this; now, does it actually occur when I do this? A first hypothesis may be inadequate, but nonetheless express a partial truth; the next hypothesis, which it and its failure may suggest, must take up that truth

² Ribot, Essay on the Creative Imagination, p. 33.

into itself and comprehend still more. We are back at a dialectical process: Kekulé wants to find a structure that will fulfil certain conditions, and he tries many before, in a drowsy moment, his great discovery comes to him like a dream; Kant wants to find that which comprehends rationalism and empiricism; Poincaré tries to find some general meaning in his equations and discovers it when stepping on a bus, after many other laboriously performed attempts had failed; Darwin's immense information becomes orderly the moment he reads Malthus. The ideal is not often given once and for all so that only the parts must be simply written out; when this is the case we have the great artistic genius like Goethe. For others, the synopsis which finally gives direction to the satisfactory synthesis is won only after a hard struggle, if at all; one hypothesis gives way to another, and so on through years and years of work. One finds this in the wrestled-for truths of the difficult dialogues of Plato's old age, or in Harlich's 605 failures.

The guiding synopsis has a complex role. It must be recognized that the process of introducing order into a complex body of facts will be made under the conditions laid down first of all by these facts themselves; in a word, the success of an hypothesis which will lead to a synthesis resulting in a synopsis of a new whole as a fait accompli (and a constructive synopsis of each part) depends in part

upon its not doing violence to the parts. The ideal of speculation in philosophy has been said to be, "Maximum der Bewältigung der Welt, Minimum der Vergewaltigung der Welt."³ Thus the synopsis or intuition of the whole is necessarily conditioned by the parts which are given, and during the course of the synthesis it must often be modified, unless, happily, it is the perfect one; the test of a synopsis is the possibility of synthesizing to it. Actually, however, the process is reciprocal. We all know of those whose synopsis of the world (Weltanschauung) is so dark that they shut out the actually bright spots; the whole as an ideal is given the authority to legislate the banishment of some parts. "Never accept a theory until it is verified by fact" is an expression of one tendency of the mind, but the other says: "Never accept a fact until it is verified by theory."

³ H. Stern, Person und Sache, I, pp. 5, 6.

and synthesis, but processes, accessories, guides, and supports them. Previous criticisms of analytic procedures, such as Bergson's, have appeared in which intellectual intuition is the alternative to analysis but in this essay it has been shown that synopsis does not appeal to "intuition" in any unique sense, and that its use is not restricted to a situation in which there is a reliance of acquaintance or intuition. Furthermore,

CONCLUSION: THE IMPORTANCE OF SYNOPSIS

IN PHILOSOPHY

In part, our criticism of analysis has been. The preceding parts of the essay have been so filled with technical and polemical problems that it may be difficult to take a synoptic view of them. To facilitate this synopsis, so that all of the parts can be seen in their proper relations, a short summary is appropriate.

There is in contemporary and recent philosophical and scientific thought a tendency towards that which has been called by many writers "synoptic" methods. This trend has many antecedents in earlier philosophical and scientific history, having its origin, perhaps, in the writings of Plato and Aristotle.

Synopsis is to be defined as the way of knowing any object as essentially a whole, a part of a whole, or both.

Synopsis thus defined is not opposed to analysis, abstraction,

and synthesis, but precedes, accompanies, guides, and corrects them. Previous criticisms of analytic procedures, such as Bergson's, have appealed to a non-intellectual intuition as the alternative to analysis. But in this essay it has been shown that synopsis does not appeal to "intuition" in any unique sense, and that its use is not restricted to cognition in which there is a salience of acquaintance of intuition. Furthermore, it has been shown that within the rational scheme in which analysis takes place, there is ground for the criticism of analysis. In part, our criticism of analysis has been internal rather than external, like Bergson's and perhaps Merz's.

Synopsis is, or is like, the normal mode of self-consciousness and of sensory experience. The togetherness and continuity of experience is a fundamental fact, and from it particular items of experience arise through differentiation. It, that is, experience itself, does not arise, as some have held, from the concretion of isolated and independent states through association or assimilation.

Synopsis is thus originally present in our empirical cognition of wholes and their parts. But knowledge itself is amenable to organization into wholes or systems,

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and this systematization of knowledge falls under the definition of synopsis as a special case, namely "regulative" as contrasted with "constitutive" synopsis.

The metaphysical supposition on which the claims to validity of synopsis are based is that there are real complex objects, both on the subjective and on the objective sides of the epistemological occasion, and that in these complex objects there are some intrinsic and internal relations such that the whole and the parts are mutually effective.

Synopsis as a valid mode of knowledge has been illustrated in its use in many fields of knowledge -- biology, psychology, characterology, mathematics, historiography, aesthetics, logic, etc. The word synopsis, though, has been only infrequently applied in some of these studies, yet the distinctive features of synoptic methodology are to be found in some of the methods of some of these sciences and others. As a merely terminological contribution, I propose the name synopsis to designate all of the various methods of science which are not uni-directionally inferential and which are, as it were, perpendicular to the search for horizontal, linear functions such as causality considered as mere historical succession or entailment (whether the direction of inference is a targo or a fronte).

In conclusion, the implications of synoptic methodology for ethics and for a general philosophy may be shown.

3. Ethical thought should be subject to evaluation with reference to the canons of a valid method as criteria. If synopsis is a complete and valid method of knowing, ethics should exhibit three characteristics: (a) It will not be abstract; (b) It will not be merely analytical-synthetic, based on an elementarism of values; and (c) It will be systematic and "philosophical", i.e. not divorced from an attitude towards the world as a whole. If, on the other hand, abstract and analytic methods are completely adequate, ethics need not have these characteristics. Assuming, now, that the inadequacy of abstraction and analysis has been shown, let us delineate the "synoptic ethics" which claims validity.

(a) Ethics should not be abstract. The type of abstractness to be avoided refers (i) to the type of value acknowledged and (ii) to the nature and occurrence of the moral judgment.

(1) The predicate of moral judgments should not be limited a priori by an abstraction from the total diversity of acts which are naively called good. If the predicate of every moral judgment is good, the ethical thinker should not make an abstraction from the particular phases of the meaning of the word as it appears in many moral judgments and then simply substitute this abstraction for the original

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predicate in the various judgments. This procedure, if supposed to result in a definition of the term limits from the beginning the scope of ethical inquiry, making it in one case (hedonism) a mere calculus of pleasures or in another (rigorism) a mere regimen for temperance. It is conceivable, but not necessary (indeed, it is unlikely) that during the course of ethical inquiry some one quality (e.g. pleasure) could be found to bear such a relation to goodness that it could be shown that all moral judgments implicitly refer to some predicate which is not stated (e.g. productive of pleasure); but this would be an a posteriori discovery in ethics, not a necessary consequence of a method of reasoning.

Even then, however, it would not be legitimate to substitute (in our example) "productive of pleasure" for "good" as a predicate in all judgments unless it could be shown that not merely the extensions of the terms overlap but also that their intensions are the same. That is to say, "productive of pleasure" would have to be equivalent to "good" in order to validate this substitution.

Actually it is very unlikely that good can be shown to be the equivalent of any other conception. This is not to deny that there may be some features or qualities which are always included in the meaning of the term good. That this is the case, and that there is some simple quantitative

relation between this part and the whole of which it is a part (i.e. the good), is presupposed in all theories of ethics which seek a scale or gradient of values with one variable (e.g. pleasure, in the hedonistic calculus). Against any single scale of values it is to be urged that the order of values it presents is dependent upon the abstraction taken as the principle of evaluation. Previously it has been shown that abstractions always involve some arbitrariness in the choice of a standpoint, and that it is possible equally well to make many abstractions. Each of these abstractions might result in a different hierarchical arrangement of particular values and judgments, and on account of the arbitrariness of the principle of order, each would be beyond criticism from the standpoints of the other abstractions and their consequent scales of value.

Values when arranged in any scale of worthfulness, whatever it may be, lose their particularity and uniqueness, for what is unique in each falls beyond the intension of the principle of order and so is irrelevant. The general implication of a quantification of values is the abstract principle mentioned above, namely, that there is but one type of real value, which appears in varying degrees of adequacy and purity in many forms (i.e. "values" recognized in "naive" experience).

(ii) A moral judgment should not be considered without reference to the total situation, past, present, and (for some types of ethical theory, knowable) future in which it arises. This situation includes the present historical contingency in which a man finds himself faced with a problem; and his behavior should be judged according as it conforms to the requirements of this. But not merely the present "visible" situation demands attention (opportunism); rather, broader aspects of this situation (its place in the life history of a man, its effect on his principles, its social reference, etc.) likewise must be referred to. The higher the morality, the more inclusive the situation which is legislative in evaluation.

The moral judgment and the conduct resulting from it should be regarded as moments in an inclusive system of judgments and a "plan of life". An ethical evaluation should depend not only on the "intrinsic" nature of the object of evaluation (as "accuracy" is supposed to be present in "veracity"), but also on the relations it has to the total complex in which it occurs. These two references to the "intrinsic" goodness and the "extrinsic" rightness of an act must be considered in all moral choice. The total complex which is the context of a moral judgment must include whatever can be called a condition or example of moral value (e.g. satisfaction,

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dition of a moral judgment must include whatever can be called

condition or example of moral value (e.g., education,

moral intention, prudence, altruistic reference), for to limit a priori the context within which valuation is supposed to occur is to be guilty of abstractionism.

(b) Ethics should not be merely analytical-synthetical, regarding values from the standpoint of elementarism. The ethical value of a whole cannot be said a priori to be the sum of the ethical values of the parts. For example, the parts of a complex act may not have value if they are performed as parts of another whole. An intention and an act take on various moral values according to the complex whole which includes them.

The moralist is enjoined to analyze moral judgments and acts as completely as possible, but it is invalid for him to deny moral value to the whole because he fails to find it in the parts (the naturalist's version of the fallacy of composition) or to attribute it to every part of the whole because he finds it in the whole (the sentimentalist's version of the fallacy of division). The shift from moral to psychological categories in the analysis of a complex situation gives evidence of real ethical wholes which are not mere sums of their parts.

But the parts may have ethical value, that is, the parts of a moral act may themselves be moral acts. The merely analytic procedure which begins with an act and refers to

the moral values of the parts is not an adequate evaluation of this act if the act is a part of some more inclusive whole in relation to which it may gain some of its value.

The analytic method would be exhaustive only if it could begin with an all-inclusive whole and work downward to its parts.

(c) As a consequence of these considerations, values of morality are seen to be arranged not in a linear scale of intensity of any one quality, but as an organic totality. This organic arrangement should be conformable to the needs and motives and regulations effective in moral agents. The principle of arrangement of satisfactions which can be found to be moral should be dependent upon the total structure of personality (Butler), not upon some abstraction from it (Kant).¹ Not merely the whole individual personality should be regarded, though; personality as a part of a wider whole should be considered as a bearer of moral values (Aristotle), and morality depends in part upon the histrionic ability of the individual to act his role.

¹ It is not permissible to say that Kant made an abstraction from the moral agent the basis of his ethics, but only that his moral agent itself is an abstraction from empirical personality which is at least naively assumed to be valuable. Also it must be admitted that Kant was much more concrete than he is generally thought to have been; here I refer to the formal, pietistic phase of Kant's thought.

Ethical rightness or wrongness arises from the types and forms of configuration of objects (acts, intentions, satisfactions, obligations, etc.) in their relations to more pervasive structures of value in which they occur. Thus an act which is morally right in times of prosperity may be wrong in times of disaster; and the wrong of one age may be the right of another. Ethical good consists in part in the intrinsic value-quality of an act, which is perhaps indefinable, and in part in the regulation of its performance in conformity with an assumed obligation of the agent to sustain and to enhance the greatest possible good, whatever it may be.² Ethical evil consists in part in the positive possession of an indefinable quality of badness, in the exclusion of a quality of ethical goodness, and in the lack of conformity with an acknowledged configuration of value. If only the last condition obtains, there is a sin of omission; if the first, or an active hindrance to the promotion of the highest possible good, the evil is a sin of commission. Thus for moral excellence in a problematical

² I assume that in any situation an agent is obligated at least to achieve the highest possible value, or a system of the "best possible". This seems to me to be an unavoidable a priori proposition, inherent in the notions of value and of obligation. The last clause, "whatever it may be", however, should prevent the misinterpretation of my view as an advocacy of any particular type of ethics of duty. This form of obligation seems to be no less a constituent in hedonism or ethical nihilism than in Kant.

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Thus synoptic consideration always refers beyond the particular moral act or judgment with which it began. It leads beyond moral objects to a moral world which is the comprehension and one condition of the particular parts of empirical morality. Synoptical ethical philosophy requires of valid ethical evaluation is to refer here beyond the bare particular first of all to schemes of value such as individual, provincial, mores, and cultural systems and institutions. These, taken as particulars, when synoptized lead onward to general philosophies of value, and in actual practice the interplay and reciprocal influences among the various schemes of value lead to the formation of cosmopolitan ethics. The development of these more comprehensive and harmonious systems is similar in its methods to the widening of outlook in the synoptic evaluation of the single acts of a single man. In these broader synopses and visions of an ideal which lead to actual historical syntheses, the moral genius has his true role, whether his synopsis be of Utopia or of the Kingdom of God on earth.

... could ye have seen the whole, no need had been
for Mary to bring forth." -- Purgatory, iii.
... many moralists have propounded ethical systems which may be called synoptical. I may mention Hegel, Bradley, Green, Moore, Rashdall, Stern, Bosanquet, and Sorley. See also E. C. Brightman, Moral Laws (N. Y., 1933).

... which seeks to embrace the world with a principle...

3. What these broader systems, these Weltanschauungen, will be depends largely on the actual content of ethical evaluation and on knowledge in general, and so they will vary from thinker to thinker and from age to age. But that there should be a comprehensive metaphysical culmination to ethical thought is inevitable if one of the conditions of valid ethical evaluation is reference beyond the particulars to wholes which are supposed to comprehend them. These comprehensive wholes constitute the indigenous and primary subject matter of metaphysics.

Metaphysics has reference not merely to the value-world of ethics, but also to the existence-world of science. In the same way that a metaphysical answer is sought for certain ethical questions, so also a metaphysical system is needed for the fundamental problems of the sciences. The supreme task of the metaphysician, however, is the integration of value and existence. Philosophy, said Spencer, is completely unified knowledge; and if philosophy is to be true philosophy, that is, if it is to integrate the parts of the world into a whole without doing violence to some of them and neglecting others, the philosopher cannot afford to be even as abstract as the synoptic moralist and attend only to values. Value alone and existence alone are abstractions; and the philosopher cannot use abstractions as though they exhausted reality, for he must know the reality from which abstractions are originally made. A false philosophy is one which seeks to embrace the world with a principle ade-

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abstractions are originally derived. A philosopher is
not like a mathematician who starts with a hypothesis and

quate only to a part of it; a true philosopher "sees life steadily and sees it whole."⁵

Thus in integrating "worlds", the philosopher mediates between the scientist and the artist. His task is like the scientist's in that it must account for given facts and provide a basis for the expectation of more, but it differs from the scientist's in that the philosopher is faced with a totality of experience, while the scientist has abstracted some facts from this totality. The categories which the scientist has used as a basis for his construction must be supplemented before they can be regarded as legitimate metaphysical principles.

The philosopher is also like the artist, in that the needs he serves are not merely intellectual, but are moral, aesthetic, and religious too. With a metaphysical ideal of completeness, the philosopher synthesizes towards his synopsis. Thus Hegel speaks of the Absolute as a result of actual dialectic; "Only at the end is it what it is in very truth." "The moments make their appearance prior to the whole in its complete fulfilment; the movements of these moments is the process by which the whole comes into being." But, he says, "In consciousness, on

⁵ Andrew Seth Pringle-Pattison, The Development from Kant to Hegel (n.d., Stechert reprint, N. Y., 1934), p. 66.

... a part of it is a true philosopher's view
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... in interesting "verities", the philosopher writes
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... the artist's view, the philosopher's view
... is seen in a different light, a different light

the other hand, the whole -- but not as comprehended conceptually -- is prior to the parts." ⁶

In the highest form of philosophizing, perhaps the intuition of the whole which guides our dealings with its parts is of the nature of mysticism, a comprehending noetic emotion of loss of segregation, of the unity and integration of the world and the self into the universe as a whole. ⁷ "... If it is the destiny of mysticism to lose its life in philosophy, it is the destiny of philosophy to recover its hold upon its object by a renewal of the mystic vision. Of each we can say, He was Himself the slayer and shall Himself be slain. The life-in-death and death-in-life of these two movements constitute the metabolism of mind." ⁸

⁶ The Phenomenology of Mind, pp. 82, 779-780. See also The Philosophy of Fine Art (Osmaston transl., 4 vols., London, 1920), vol. 1, p. 32. Cf. McTaggart's statement that the movement of the dialectic "from lower to higher is reconstruction and not construction." (J. M. E. McTaggart, Studies in Hegelian Dialectic, 2nd ed., Cambridge, 1922, p. 160.) See also Hegel's The Philosophy of Fine Art (Osmaston transl., 4 vols., London, 1920), vol. 1, p. 32.

⁷ "The way of unity." Cf. Rudolf Otto, Mysticism, East and West, (transl., N. Y., 1932), pp. 41 ff.

⁸ Charles A. Bennett, A Philosophical Study of Mysticism, p. 110.

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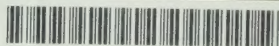
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